Bean Tunnel

Ecological Impact Assessment

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Bean Tunnel

Ecological Impact Assessment

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This report dated 18 June 2024 has been prepared for Kent County Council (the "Client") in accordance with the terms and conditions of appointment dated 05 October 2023(the "Appointment") between the Client and **80 Fenchurch Street London** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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EXECUTIVE SUMMARY

Arcadis Consulting (UK) Limited was commissioned by Kent County Council to conduct an Ecological Impact Assessment (EcIA) for proposed development at Bluewater, Kent, and the adjacent Eastern Quarry site. The proposed development includes the construction of a new tunnel through the chalk spine under the B255 Bean Road between Bluewater Shopping Centre and the Eastern Quarry site, serving to directly connect the shopping centre to the new Eastern Quarry development and Ebbsfleet International Railway Station. This EcIA should be read in conjunction with the Biodiversity Net Gain (BNG) assessment (10044832-ARC-00-ZZ-RP-EC-0010-01-BNG-report), Bat Hibernation report (6511-LLB-RP-EC-0001) and Ecological Method statement for Vegetation Clearance (10044832-ARC-00-ZZ-RP-EC-0010-01-MS).

Initial preliminary ecological appraisal (PEA) survey (10044832-ARC-00-ZZ-SU-EC-0010-01-PEA) and subsequent reporting were undertaken by Arcadis in 2023 and 2024 to assess and map habitats within the site. The assessment also included a valuation of habitats in relation to their condition for BNG, as well as the potential to support protected / notable species. A suite of bat surveys has been carried out and appended to the end of the report, with their results to form part of this assessment. A desk study has been undertaken which identified notable species and habitats within the area. In 2018 and 2019 Arup produced ecological assessments and reports of the site which supported the previous planning submissions. The wider Bluewater site has been monitored throughout 2022 and 2023 by Middlemarch who have also produced a several species and habitat monitoring reports. Previous reports and findings from Arup and Middlemarch have been shared with Arcadis and were used to inform the current assessment.

The following features were scoped in for impact assessment on the basis that impacts could potentially be determined significant in the absence of precautionary avoidance or mitigation. These were reedbed, invasive non-native plant species, other amphibians, reptiles, birds, and bats. Most features scoped in for assessment

were considered to be of Site value when assessed for importance. The invasive non-native plant species on-site is considered a threat to biodiversity. Due to their county-wide importance, reedbed and hibernating bats have been considered County level when assessed for their importance on-site.

Reedbed is found on-site and is listed as a Habitats of Principal Importance in England (HPIE) listed under Section 41 of the NERC Act 2006. Due to site clearance requirements of this habitat, mitigation has been provided for affected habitat. Other habitats including scrub, woodland are also important components of the site which require partial clearing. Habitat compensation for all species on-site will be addressed through the Statutory BNG metric, ensuring that an overall net-gain (minimum 10%+) in biodiversity units is achieved, and trading summaries for the loss of high distinctiveness habitat are satisfied. The strategy to achieve BNG primarily focusses on on-site and off-site reedbed creation, grassland enhancement, tree planting, and scrub creation (10044832-ARC-00-ZZ-RP-EC-0010-01-BNG-report and 10044832-ARC-00-ZZ-RP-EC-0010-01-BNG-metric). The BNG strategy will provide habitat in a Dartford Biodiversity Opportunity Area supporting The Dartford Plan.

A patch of Small-leaved Cotoneaster approximately 4x4 m was recorded at the within the site, this is a Schedule 9 invasive non-native species on the Wildlife and Countryside Act 1981. Ensuring this species is removed correctly has been considered to remove the risk of spread and establishment throughout the area.

No great crested newt have been found on-site. The site is likely used by other amphibians including common frog, common toad, and smooth newt. Common toad is listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Impacts from habitat clearance are anticipated to negatively impact these species. As a result, mitigation in the form of careful vegetation clearance, creation of log piles and suitable habitat has been provided within the Ecological Method statement for Vegetation Clearance.

As part of the Middlemarch protected species monitoring surveys undertaken in 2022 and 2023 reptile surveys identified low populations of common lizard and slow worm approximately 250 m south of the site. Due to the connectivity of suitable habitat, reptiles have potential to be impacted by the development. Similar to mitigation for other amphibians, reptiles have also been considered within the Ecological Method statement for Vegetation Clearance.

Although no active bird nests were identified on-site, the mixed scrub, broadleaved woodland, urban tree, cliff faces and reedbeds at the western portal entrance provide potential habitat for nesting birds. Consideration of nesting birds within habitats due for vegetation clearance has been taken into account within this assessment and mitigation provided.

A total of two disused tunnels are present on-site, and an additional tunnel is also present located 30 m south of the site. Swarming surveys undertaken in 2018 by Arup identified low numbers of common pipistrelle, Daubenton’s bats and brown long-eared bats using Tunnel 1 and Tunnel 2 as a swarming site. During the hibernation surveys undertaken by Arup in 2018/2019 Tunnel 1 was identified as supporting hibernating common pipistrelle and concluded Tunnel 2 could be used by hibernating bats. In terms of summer occupancy, the 2019 activity surveys identified Tunnel 1 and Tunnel 2 used by common pipistrelle, soprano pipistrelle, brown long-eared bats. Tunnel 1 was also recorded as a summer roost for Daubenton’s bats. No evidence of roosting bats were recorded in Tunnel 3. No Maternity roosts were identified on-site during these surveys.

Updated bat surveys were undertaken in 2023/2024, comprising swarming, hibernation, and emergence surveys. Although no swarming occurred whilst surveyors were recording on-site, static bat detectors located outside Tunnel 1 and 2 recorded a large number of common pipistrelle bat calls over short periods and a likely indicator for swarming common pipistrelle bats. The surveys confirmed all three tunnels being used by hibernating bats. Tunnel 1 recorded the largest number of hibernating bats (four species) including common pipistrelle, soprano pipistrelle, brown long-eared bat, and Natterer's bat. Tunnel 2 recorded one species of hibernating bat, common pipistrelle, and Tunnel 3 recorded a single hibernating Natterer’s bat. In terms of summer occupancy, three brown long-eared bats were

recorded using Tunnel 1 as a day roost, with other species including common pipistrelle, brown long-eared bat and Myotis bats (likely Daubenton's bat) using the tunnel for forage and to pass through. No bats were observed emerging from Tunnels 2 or 3.

Although the works will not result in the direct loss of roosting features, a mitigation licence will be required due to the potential disturbance of hibernating bats within the tunnels. Mitigation has been identified to minimise potential adverse impacts on bats including mitigation and compensation measures for noise/vibration, lighting, and night working.

Hazel dormouse surveys undertaken by Middlemarch in 2022 identified a single hazel dormouse nest approximately 400 m south of the site along the southern cliffs of the Bluewater site. Connectivity between the site and woodland containing hazel dormouse is limited with the cliff face between the woodland and site consisting of limited vegetation, creating a sparse link between habitats. The only viable route connecting habitats and the nest site is in the form of a thin strip of scrub with trees situated between the cliff face and Kent Fastway Road. This 200m long strip of woodland consists of a 2m wide mix of scrub and trees. The strip does not provide the same habitat structure compared to the woodland identified as a nesting site and requires hazel dormice to leave suitable habitat making it only accessible for dispersing hazel dormouse. It is therefore highly unlikely that the works would affect the favourable conservation status of the hazel dormouse population using the woodland to the south. Nonetheless, as a precautionary measure, the Ecological Method Statement for Vegetation Clearance has considered hazel dormouse to remove all risks of negatively impacting to this species and to ensure legal compliance.

1 INTRODUCTION

1.1 Background

Arcadis Consulting (UK) Limited ('Arcadis') was commissioned by Kent County Council to produce an Ecological Impact Assessment (EcIA) report regarding proposals at Bluewater, Kent and the adjacent Eastern Quarry site, hereafter referred to as the 'site'. This was to inform proposals for the construction of a new tunnel through the chalk spine under the B255 Bean Road between Bluewater Shopping Centre and the Eastern Quarry site.

1.2 Site Location and Setting

The site is located in Dartford, Kent (Ordnance Survey (OS) Grid Reference TQ 58470 73348). The site boundary is shown in Drawing 1, Appendix A. The site is split between the western and eastern side of the B255 Bean Road.

The western extent of the site is located west of the B255 Bean Road and consists of habitat including woodland, scrub and reedbed. The reedbed formed part of the original development in 1996-1998 to provide final treatment for surface water from paved areas. The western extent also includes highway, paving and a single building which was a Thames Water building and facilitated part of the water treatment process on-site. A grassed area outside the red line boundary to the north of the Thames Water building will be used as an area to contain a temporary compound during construction.

There are two tunnels within the chalk spine on-site originally constructed to facilitate a connection between Western and Eastern Quarry, also serving as conduits for material transport between the Quarries when Bluewater Shopping Centre was under construction. These are referred to as the northern (Tunnel 2) and southern (Tunnel 1) haulage tunnels. There also exists the former conveyor tunnel (Tunnel 3) which sits outside the site boundary.

1.3 Development Proposal

The proposed development comprises the construction of a new tunnel and relevant road infrastructure to provide bus, cycling, and pedestrian accessibility on the eastern side of Bluewater. This initiative aims to establish a connection between residential development within the former Eastern Quarry, known as the Whitecliffe development, which is under construction. The proposed new tunnel is planned to be situated north of the two existing haulage tunnels (Tunnels 1 and 2), and the conveyancing tunnel (Tunnel 3) outside of the application area. The northern haulage tunnel (Tunnel 2) is situated closest to the new tunnel approximately 20 m.

Currently the northern haulage tunnel (Tunnel 2) is mostly open at both ends with a minor spoil heap at its eastern entrance. As part of the proposed development, this tunnel will be lit and be made available for construction-related pedestrian and light plant movement. Following construction, the northern tunnel (Tunnel 2) portal will be sealed with a gap fitted with grilles to deter human access while facilitating bat entry and exit. Currently the southern haulage tunnel (Tunnel 1) is mostly closed due to a spoil heap blocking 90% of the entrance of the eastern end of the tunnel. Tunnel 1 will be retained and not used for construction works and safeguarded to protect bats and their roosts, with mitigation features placed within the tunnel to include bat hibernation boxes. A fence and gate will be put in place at the conveyancing tunnel (Tunnel 3) portal to prevent unauthorised entry while enabling access for bat monitoring.

The proposed development of Bean Tunnel and associated infrastructure is anticipated to take a maximum of 15 months to complete, with a commencement date of March 2025.

1.4 Previous Surveys, Reports, and Undertakings

The site was granted planning permission in June 2020 (application reference number: DA/19/1549 (KCC/DA/0232/2019), this permission has now expired. A suite of ecological surveys and associated reports were produced by Arup in 2018 and 2019 and were included within the original planning application. The approved application included the provision of compensation due to the impact from the proposed development in the form of reedbed creation, reptile habitat creation, bat mitigation, and planting of 30 trees. Although the development itself did not go ahead, all mitigation except reedbed creation has been carried out. The bat provisional compensation consisted of the installation of bat boxes and boarded cladding in Tunnels 1 and 3. Log piles were provided within the woodland areas within the site. A total of 30 trees were planted along the east side of Lake 5, to the west of the Bluewater site (location of trees are detailed in Drawing 3 Appendix A).

Since the installation of bat features in 2018 and 2019, additional features have been installed within Tunnel 2 in the form of bat boxes and wooden boarded cladding.

Middlemarch carried out several monitoring surveys within the site and Bluewater Shopping Centre site in 2022/2023.

Previous reports and findings from Arup and Middlemarch have been shared with Arcadis and were used to inform the current assessment.

1.5 Scope of Work

The scope of this assessment includes the following:

- A desk study;
- An Ecological Impact Assessment (EcIA), supported by Preliminary Ecological Appraisal (PEA) of habitats and features within the red line boundary; and,
- Associated habitat mapping.

This report should also be read in conjunction with the following ecological reports prepared by Arcadis:

- BNG Metric with associated BNG report (10044832-ARC-00-ZZ-RP-EC-0010-01-BNG-report);
- Bat Hibernation Report (6511-LLB-RP-EC-0001); and,
- Ecological Method Statement for Vegetation Clearance (10044832-ARC-00-ZZ-RP-EC-0010-01-MS).

Only habitats within the redline planning application boundary have been assessed.

2 METHODOLOGY

2.1 Overview

An updated desk-based survey was undertaken to gather existing ecological information using online sources, and through a data search sourced from Kent and Medway Biological Records Centre (KMBRC). The desk study also included reviewing previous surveys and reports undertaken by Arup and Middlemarch.

A PEA survey with BNG condition assessment survey (based on UKHab methodology) was carried out which was extended to consider all protected and notable species relevant to the site. An assessment of habitat condition was undertaken using the Statutory Biodiversity Metric Calculation tool produced by the Department for Environment Food and Rural Affairs (DEFRA, 2023).

Lloydbore Ltd were commissioned on behalf of Arcadis to undertake bat surveys of three tunnels (Tunnel 1, 2 and 3). Bat autumn swarming surveys were conducted on 31 October and 6 November 2023. Subsequent to this, winter hibernation surveys were completed from December 2023 to late February 2024 and summer emergence surveys were carried out from May to late June 2024.

2.2 Desk Study

In November 2023, Arcadis undertook an updated desk study to identify any existing ecological information relating to the site and its surroundings. The following resources were used:

- The Multi-Agency Geographical Information for the Countryside (MAGIC);
- A data request to Kent and Medway Biological Records Centre (KMBRC);
- OS mapping and aerial photography (Google mapping);
- Section 41 of the NERC Act 2006 (HMG, 1996) lists of habitats and species; and,
- The Dartford Plan to 2037 (Dartford Borough Council, Adopted April 2024).

The MAGIC (DEFRA) website was used to search for statutory designated sites of nature conservation value, granted European Protected Species Mitigation (EPSM) licence applications within the last 10 years, ancient woodland and Habitats of Principal Importance in England (HPIE) listed under Section 41 of the NERC Act 2006 (HMG, 2006). National Site Network and Ramsar sites were also searched.

The KMBRC provided data within the last 10 years (November 2013 onwards).

The MAGIC and KMBRC search for habitats and species utilised the following search radiuses:

- A 500 m search for HPIE;
- A 2 km search for statutory and non-statutory designated sites;
- A 10 km search for designated sites within the National Site Network and Ramsar sites which are designated for bats or birds; and

- A review of all waterbodies within 500 m of the site.

Aerial Photography was utilised to gain insight into the surrounding landscape and the site's connectivity to other suitable habitats, such as ponds in the immediate area.

Aerial Photography was used to examine the site in the wider context; identify potential ecological features that may not be evident on the ground during the field survey; and identify potential barriers to animal movements (such as road networks, built development and major water courses).

The Dartford Plan to 2037 was reviewed to identify habitat creation/enhancement areas within Biodiversity Opportunity Areas.

2.2.1 Previous survey and reports

A suite of ecological surveys and their reports were produced within the site boundaries and Bluewater over the previous 6 years by third parties as part of previous planning applications, and monitoring requirements. The list of surveys is detailed in Table 1 below; methodologies for these surveys are included within the relevant reports as referenced.

Table 1 Previous ecological surveys carried out

Survey	Date	Reference
Extended Phase 1 habitat survey and preliminary bat roost assessment	2018	(Arup, 2019a)
Bat hibernation surveys	2018/2019	(Arup, 2019b)
Bat emergence/re-entry surveys	2018/2019	(Arup, 2019b)
Bat automated surveys	2018/2019	(Arup, 2019b)
Great crested newt (GCN) (*Triturus cristatus*) environmental DNA surveys	2019	(Arup, 2019c)
Notable Plant survey	2021/2022	(Middlemarch, 2022)
Bat surveys	2023	(Middlemarch, 2023a)
Hazel Dormouse (*Muscardinus avellanarius*) survey	2023	(Middlemarch, 2023b)
Hedgehog (*Erinaceus europaeus*) assessment	2023	(Middlemarch, 2023c)

Survey	Date	Reference
Reptile and amphibian survey	2023	(Middlemarch, 2023d)

2.3 Field Survey

2.3.1 PEA Survey

In 2023, an extended UKHab survey with a BNG condition assessment survey (based on UKHab methodology) was undertaken on 17 and 18 October by Arcadis Ecologist Sam Kendray MCIEEM. The habitats within the red line boundary (Drawing 2, Appendix A), including built structures, were assessed for their ecological value and their potential to support non-native invasive and/or protected/notable species. Photographs were taken during the field survey and Target Notes (TN; Appendix B) were made to inform the identification of ecological constraints.

The survey was undertaken following the UKHab guidance (UKHab Ltd, 2023) and Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (CIEEM, 2017) with information recorded on a handheld GPS/GIS equipped tablet.

Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types.

Invasive non-native plants, particularly those on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (HMG, 1981) were searched for during the survey.

2.3.2 Bat Surveys

A suite of bat surveys were carried out within the tunnels by Arup in 2018 and 2019 (Arup, 2019b) and included swarming surveys, hibernation assessment, emergence/re-entry surveys, and statics monitoring.

A single transect survey which was undertaken by Middlemarch in 2023 (Middlemarch, 2023a) was utilised to gather a profile of use by bats within the Bluewater site. The transect locations were situated around the eastern, southern and western boundaries of the Bluewater site, with the first stop point located adjacent to the proposed development site.

An updated set of bat surveys were carried out by Lloydbore on behalf of Arcadis between 2023 and 2024. A summary of surveys included are listed below, however further details of bat methodology used is available in **Error! Reference source not found.**the Bat Hibernation Report (6511-LLB-RP-EC-0001):

- Preliminary roost assessment: October 19, 2023;
- Autumn swarming surveys: October 31 and November 6, 2023;
- Winter hibernation surveys: December 2023 to late February 2024;
- Static monitoring: October 19, 2023, to January 16, 2024; and,

- Summer emergence surveys: May to late June 2024.

2.3.3 Off-site baseline BNG baseline assessment

Additional site surveys were carried out by Arcadis Senior Ecologist Joel Cronin MCIEEM to identify areas of the Bluewater site suitable for habitat creation and enhancement for the purposes of achieving BNG. These were carried out on 17 February and 21 May 2024 (assisted by the Bluewater Environment and Sustainability manager Claire Forest). The survey included condition assessments on Lake 4 (potential for reedbed creation), and areas deemed suitable for grassland or scrub enhancement and creation.

During the surveys of these areas, invasive plants, and dominant plant species were noted, as were any uncommon species and species indicative of particular habitat types.

Results of these surveys are captured within the BNG report (10044832-ARC-00-ZZ-RP-EC-0010-01-BNG-report).

2.4 Assessment Methodology

In accordance with the BS 42020:2013 Biodiversity - Code of Practice for Planning and Biodiversity (BSI Standards, 2013), the criteria that have been used to determine the assessment of effects follows the approach recommended by the CIEEM guidelines (CIEEM, 2017), with the focus on those activities that could potentially generate significant ecological effects on Important Ecological Features (IEF) or result in a breach of wildlife legislation.

2.4.1 Determining Importance

A geographic frame of reference has been used to determine the importance of the ecological feature, the highest being International and European importance followed by National, County, Local and Site level importance, see Table 2.

Those ecological features of Site level importance and above, have been classified as IEFs and have been ‘Scoped in’ for more detailed assessment, as outlined in the CIEEM Guidelines (CIEEM, 2018). These are considered of sufficient importance to be material to decision-making, and which could potentially experience significant effects as a result of the proposed development (effects that could negatively affect the integrity of the habitat or the favourable conservation status of a species’ local population). Ecological features of less than ‘Site’ importance have been ‘Scoped Out’ and are not subject to any further assessment within this report.

In accordance with the CIEEM Guidelines (CIEEM, 2018), where there is the potential for a breach of legislation in relation to protected species (regardless of their value), those species are also considered as IEFs.

Table 2: Scale of importance

Importance	Criteria
International and European	**Habitats**

Importance	Criteria
	An internationally designated site or candidate site (SPA, provisional SPA, SAC, candidate SAC, Ramsar Site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area that would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. **Species** Any regularly occurring population of internationally important species, threatened or rare in the UK (i.e. an International Union for Conservation of Nature red list species that is also a UK Red Data Book or SPIE). A regularly occurring, nationally significant population/number of an internationally important species.
National (England)	**Habitats** A nationally designated site (SSSI), National Nature Reserve (NNR), Marine Nature Reserve (MNR)) or a discrete area, which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a HPIE, or of smaller areas of such habitat essential to maintain wider viability. **Species** A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species, threatened or rare in the region or county (see Local Biodiversity Action Plan). A feature identified as of critical importance in the UK under S41 of NERC 2006.
Regional (East of England)	**Habitats** Sites that exceed the County-level designations but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or smaller areas of habitat essential to maintain wider viability. **Species** Any regularly occurring, locally significant population of a species listed as being nationally scarce, which occurs in 16 of 100 10km2 squares in the UK or in a Regional BAP. A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.
County (Kent)	**Habitats** Sites recognised by local authorities, e.g. Local Nature Reserves. Non-statutory designations attributed by the Local Planning Authority such as Sites of Importance for Nature Conservation (SINCs). A viable area of habitat identified in the Kent Nature Partnership Biodiversity Strategy (Kent Nature Partnership, 2020).

Importance	Criteria
	A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25ha. **Species** Any regularly occurring, locally significant population of a species listed in Kent Nature Partnership Biodiversity Strategy (Kent Nature Partnership, 2020) due to regional rarity or localisation. A regularly occurring, locally significant population of a County important species. Sites supporting populations of internationally / nationally / regionally important species that are not threatened or rare in the region or county, and not integral to maintaining those populations. Sites/features scarce in the County or that appreciably enrich the County.
Local	**Habitats** Areas of habitat considered to appreciably enrich the habitat resource in the local context including features of importance for migration, dispersal, or genetic exchange. **Species** Species populations or communities considered to appreciably enrich the habitat resource in the local context including features of importance for migration, dispersal or genetic exchange.
Site	**Habitats** Areas of habitat considered to appreciably enrich the site, but not sufficiently large in extent or favourable condition to warrant inclusion at the Local level. **Species** Species populations or communities considered to appreciably enrich the site, but not sufficiently large or critical to warrant inclusion at the Local level.

2.4.2 Assessing Significance

Following the identification of the value of the ecological feature it was necessary to determine the character of potential impacts. The following parameters are considered:

- positive or negative
- extent
- magnitude
- duration

- frequency and timing
- reversibility

These categories, along with the geographical context of the ecological feature are utilised to determine the ‘character’ of the impact and define it as ‘significant’ or ‘not significant’.

A significant effect is defined as one which is considered likely to affect the integrity or conservation status of an ecological feature. Where a significant effect is identified, the value of the feature has been used to help determine the geographical scale at which the effect is significant. Thus, any negative effect which is considered to significantly affect the integrity of a receptor of, for example national value, has been identified as being a nationally significant effect. This approach to determining the significance of effects is in line with CIEEM’s best practice guidance (CIEEM, 2018).

2.5 Limitations

This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time. Consequently, there is a potential for further information to become available, which may change this report’s conclusion and for which Arcadis cannot be responsible.

Field surveys are limited by a variety of factors which affect the presence of flora and fauna (e.g. climatic variation, season and species behaviour). A lack of evidence of a protected species during a survey does not mean that the species is absent; hence the survey also records and assesses the ability of habitats to support such species. The time frame in which the survey is undertaken provides a snapshot of activity within the survey area and cannot necessarily detect all evidence of use by a species.

Whilst every effort has been made to provide a comprehensive description of the site, no investigation can ensure the complete characterisation of the natural environment. The survey to support PEA and BNG condition assessment survey do not constitute a full botanical survey. Plant species may have been under-recorded, unidentifiable or not visible due to the time of year the survey was carried out. The main field survey to support PEA was completed in October, which is outside the main flowering season. Given the managed nature of the site and the habitats present, it is considered that the survey, alongside the desk study, are sufficient to inform the presence/absence of protected or notable species on-site and is sufficient for characterising the habitats present.

Desk study data is not likely to be exhaustive and is not up to date in most cases; it is therefore possible that protected species not identified during the data search do in fact occur within the vicinity of the site. The purpose of the field survey is to determine the likelihood that such species would be present to overcome this limitation.

In accordance with CIEEM guidance (CIEEM, 2019), the details of this report will remain valid for a period of at least 12 months. Beyond this period, if works have not yet been undertaken, it is recommended that a review of the ecological conditions is undertaken to provide an update on the current status of the site.

3 RESULTS

3.1 Reporting Outline

This section outlines the biodiversity baseline based on both desk-based research and field survey. Based on the information obtained, a statement is made whether an ecological feature will be scoped in for impact assessment based on the assessment methodology outlined in Section 2.4.

3.2 Statutory Designated Sites for Nature Conservation

Table 3 below provides information on the three ecological statutory designated sites identified within 2 km of the site. No National Site Network sites or Ramsar sites with bats or birds as designated features were identified within 10 km of the site.

Table 3: Ecology Statutory designated sites within 2 km of the site

Designated site	Reason for designation	Distance and direction from the site
Darenth Wood Site of Special Scientific Interest (SSSI)	The site comprises some of the most valuable areas of ancient semi-natural woodland in north-west Kent. The site supports many rare invertebrate species.	0.5 km south-west
Swanscombe Peninsula SSSI	Designated for its assemblages of invertebrates, assemblages of breeding birds, population of rare plants and its geology.	1.9 km north-east
Swanscombe Marine Conservation Zone	The site supports tentacled lagoon worms, which are found in the intertidal and subtidal soft sediments. This small worm is scarce throughout the UK and lives within a tube made of mud in sheltered lagoons and estuaries. Intertidal mud supports the tentacled lagoon worm feature and is a highly productive ecosystem that provides important feeding grounds for wading and migratory birds.	1.9 km north

3.2.1 SSSI Impact Risk Zones

The site is within a SSSI impact zone relating to Swanscombe Peninsula SSSI which states that the Local Planning Authority (LPA) should contact Natural England on likely risks from any transport proposal, including roads.

Swanscombe Peninsula SSSI is over 1.9 km from the site and given the small scale and nature of the proposed development it not considered a risk to this designated site.

3.3 Non-statutory Designated Sites for Nature Conservation

Table 4 below provides information on the three non-statutory designated sites identified within 2 km of the site. Given the small scale and nature of the proposed development it not considered a risk to these designated sites.

Table 4: Non-statutory designated sites within 2 km of the site

Designated site	Distance and direction from the site
Alkerden Pit, Swanscombe Local Wildlife Site (LWS)	1.1 km north-east
Beacon Wood Country Park LWS	1.5 km south
Eagles Wood Woodland Trust Reserve	1.5 km north

3.4 Important Habitats

Eight parcels of Priority Deciduous Woodland habitat were identified within 500 m of the site with the closest approximately 200 m south of the site. A parcel of ancient woodland was identified approximately 470 m south-west of the site. No other notable habitats were identified within 500 m of the site.

3.5 Habitats – Field survey

3.5.1 Overview

The site supported several habitats including modified grassland, broadleaved woodland, reedbed, mixed scrub, scree, ruderal vegetated land, and individual trees. The reedbed habitat within the site is situated within two concrete beds which formed treatment for surface water from the surrounding paved areas. Since its establishment within the reedbeds, the habitat has naturally spread outside of the concrete beds and established within the wetter areas of the site. The wetter area is surrounded by established mixed scrub, which is dense and unmanaged, as well as broadleaved woodland. Outside of the areas of dense vegetation are patches of

managed vegetation in the form of landscaped planting including planted urban trees, and grassland. The cliffs which are located within the site comprise scattered scrub and ruderal vegetation.

Each habitat has been mapped and assigned an area number as shown on Drawing 2, Appendix A.

3.5.2 Grassland - Modified Grassland (Area 1)

The site supported modified grassland verges adjacent to roads, these supported common grassland species including Perennial Ryegrass (*Lolium perenne*), Fescue (*Festuca sp.*), Yorkshire-fog (*Holcus lanatus*), Ribwort Plantain (*Plantago lanceolata*), Common Mouse-ear (*Ceratium fontanum*) and Common Dandelion (*Taraxacum officinale* agg.). These areas of grassland are regularly cut short to achieve a low sward height for the purposes of road user safety.

This habitat is common and managed for low sward with limited value to biodiversity, and therefore is not considered to appreciably enrich the site. This habitat has an importance lower than Site value and is Scoped out of further assessment.

3.5.3 Woodland – Other woodland; broadleaved (Area 2 and 3)

The site supported two areas of broadleaved woodland within the western side of the site. The first patch of broadleaved woodland was located at the base of the cliffs (Drawing 2 Appendix A, TN1 Appendix B) and contained Hazel (*Corylus avellana*) coppice together with Alder (*Alnus glutinosa*), Willow (*Salix sp.*), Field Maple (*Acer campestre*), Sycamore (*Acer pseudoplatanus*), and Oak (*Quercus sp.*) trees. The understorey was a mixture of Butterfly-bush (*Buddleja davidii*), Dogwood (*Cornus sanguinea*) and Dogrose (*Rosa canina* agg.) with areas of dense Bramble (*Rubus fruticosus* agg.) scrub in the south.

The second small parcel of broadleaved woodland was located adjacent to the Thames Water building north of the western side of site and comprised young plantation woodland dominated by Field Maple, and young Oak trees with occasional Hazel coppice stands and young Ash (*Fraxinus excelsior*) trees. The understorey was a mixture of Privet (*Ligustrum vulgare*) and Dogwood scrub.

Both woodland patches are unlikely to be more than 20 years old due to the age of the site in terms of the establishment of the Bluewater Shopping Centre. Although used by nesting birds, their intrinsic value as habitats is below Site value and are Scoped out of further assessment.

3.5.4 Wetland – Reedbeds (Area 4)

The site contained reedbeds which supported Reed Canary-grass (*Phalaris arundinacea*), Common Reed (*Phragmites australis*) and Pendulous Sedge (*Carex pendula*) (Drawing 2 Appendix A, TN2 Appendix B). These reedbeds were part of the original development in 1996-1998 to provide final treatment for surface water from paved areas. Although the reedbeds were originally planted within concrete beds, overtime small patches have spread and established within the site. Although the Bluewater site contains multiple reedbeds used for surface water treatment, the habitat is considered uncommon within the county with four other sites within 2km. The habitat is also likely to be used by birds identified within the desk study search area. Reedbeds are a HPIE but is not included within the main targets for the Kent Nature Partnership Biodiversity Strategy (Kent Nature Partnership, 2020) which aims to improve certain ‘priority’ habitats and species.

Reedbed is an uncommon habitat in the local area, likely to be used by birds identified within the desk study search area and is classified as a HPIE. The habitat is not part of the local biodiversity strategy but is considered a habitat with County level value of importance and as a result has been Scoped in for further assessment.

3.5.5 Heathland and Shrub – Mixed scrub (Area 5)

A large part of the site supported dense scrub comprising, Dogwood, Hawthorn (*Crataegus monogyna*), Bramble, Willow saplings, and Dogrose. Around the Thames Water building this habitat was dominated by Dogwood that was cut to approximately 1 m in height. Both areas are densely vegetated with no clearings providing sheltered edges for wildlife. A patch of small-leaved cotoneaster was identified within the northeastern portion of the habitat area, located next to the western cliff face.

The habitat is likely to be used by reptiles and nesting birds. In terms of habitat importance, the habitat does not enrich the site due to the presence of invasive species. Its intrinsic value as habitat is below Site value and is Scoped out of further assessment.

3.5.6 Sparsely Vegetated Land – Other inland rock and scree (Area 6 and 7)

The site supported chalk cliffs on either side of the B255 (Drawing 2 Appendix A, TN3/TN4 Appendix B), these cliffs supported scattered scrub and ruderal vegetation comprising, Hawthorn, Bramble, and Butterfly Bush. This habitat type is prevalent within Kent and is an important landscape asset within the county. The rock element of the cliff face is unlikely to support roosting/nesting species due to the nature of the rock and unstable climatic conditions. Its biodiversity value is below Site value, and it is Scoped out of further assessment.

3.5.7 Sparsely Vegetated Land – Ruderal/ Ephemeral (Area 8)

The eastern side of the site support an area of tall ruderal vegetation which supported Canadian Fleabane (*Erigeron canadensis*), Red Clover (*Trifolium pratense*), Ribwort Plantain, Yorkshire-fog and Butterfly Bush.

This habitat is common, widespread, poorly connected to other vegetated habitats, and has limited value to protected/notable species. The habitat is considered below Site value and therefore is Scoped out of further assessment.

3.5.8 Urban – Developed land; sealed surface (Area 9)

The site supported areas of hardstanding which were sections of road, pavement and the existing northern haulage tunnel which will be used during the works. There was a single building within the western side of the site which was a Thames Water building which formed part of the water treatment process on-site.

This habitat is of negligible value to biodiversity, is below Site value and is Scoped out of further assessment.

3.5.9 Individual Tree – Urban tree

The site supported 23 small urban trees with species including, Oak and Willow. These trees were likely part of the original landscape planting provided during the establishment of the Bluewater Shopping Centre between 1996-1998.

These trees were young and are considered lower than Site value and are Scoped out of further assessment.

3.6 Protected / Notable Species

KMBRC returned 120 records of notable plant species within 2 km of the site, which included 50 species (Appendix D

Table 13). In total 23 records of 13 notable plant species were identified within the Bluewater site. Some of these species could be present on the chalk cliff face on-site including Wild Strawberry (*Fragaria vesca*), Quaking-grass (*Briza media*), Man Orchid (*Orchis anthropophora*), and Carline Thistle (*Carlina vulgaris*).

Middlemarch undertook notable plant surveys of the Bluewater site in 2021 and 2022 (Middlemarch, 2022), and recorded the plant species identified in Table 5. The closest species to the site identified from the Middlemarch survey was Ragged Robin (*Silene flos-cuculi*) which was located approximately 300 m southwest of the site near the lake within the southern extent of the Bluewater Shopping Centre and is listed as being of 'Least Concern' (JNCC, 2014). This species is associated with damp ground and could be present within reedbed on-site.

Table 5 Notable Plant Survey 2021/2022 - Middlemarch

Species (common name)	Species (Latin name)	Location (What3words)
Blue pimpernel	*Anagallis monellii*	///rescue.pets.boxing
Broad Leaved helleborine	*Epipactis helleborine*	///moving.host.chairs
Ivy Broomrape	*Orobanche hederae*	///focal.tens.famous
Jersey Cudweed	*Gnaphalium luteoalbum*	///sounds.tuck.mobile
Man orchid	*Orchis anthropophora*	///tiny.skips.basic
Round leaved cranesbill	*Geranium rotundifolium*	///dozed.scuba.wiped
Sanicle	*Sanicula europaea*	///places.helps.eagles
Common cudweed	*Filago vulgaris*	///softly.waddled.answer
Carline thistle	*Carlina vulgaris*	///cove.blur.stove
Basil thyme	*Clinopodium acinos*	///backs.slam.bride
Wild Strawberry	*Fragaria vesca*	///reader.moons.post
Narrow leaved everlasting pea	*Lathyrus sylvestris*	///exists.family.bind
Cowslip	*Primula veris*	///second.sake.hips
Ragged robin	*Silene flos-cuculi*	///lift.flute.eaten

Although no notable plants have been identified within the site, the conditions are suitable for them and so they have been Scoped in of further assessment.

3.6.1 Invasive non-native species

KMBRC returned records of 12 species of invasive non-native plant species identified within Schedule 9 of The Wildlife and Countryside Act 1981 (as amended) (HMG, 1981) within 2 km of the site, comprising, Canadian Waterweed (*Elodea canadensis*), Nuttall's Waterweed (*Elodea nuttallii*), Three-cornered Garlic (*Allium triquetrum*), Spanish Bluebell (*Hyacinthoides hispanica*), Hybrid Bluebell (*Hyacinthoides non-scripta x massartiana*), Winter Heliotrope (*Petasites fragrans*), Rhododendron (*Rhododendron ponticum*), Hollyberry Cotoneaster (*Cotoneaster bullatus*), Wall Cotoneaster (*Cotoneaster horizontalis*), Himalayan Cotoneaster (*Cotoneaster simonsii*), Japanese Rose (*Rosa rugosa*) and New Zealand Pigmyweed (*Crassula helmsii*). There was a single record of the invasive non-native invertebrate species western conifer seed bug (*Leptoglossus occidentalis*) within 2 km of the site.

The closest record was for Winter Heliotrope recorded approximately 670 m south-west of the site.

A patch of Small-leaved Cotoneaster (*Cotoneaster microphyllus*) approximately 4x4 m was recorded at the base of the western cliffs within the area of scrub (Drawing 2 Appendix A, TN5 Appendix B). This is a Schedule 9 invasive non-native species on the Wildlife and Countryside Act 1981 (as amended) (HMG, 1981). The precise location of this species was recorded at TQ5846073536.

Butterfly Bush is common throughout the site and although it is not a Schedule 9 invasive non-native species, it is often considered invasive as it outcompetes native species.

Small-leaved cotoneaster recorded on-site is considered to be a threat to biodiversity, through outcompeting native plants, damaging infrastructure, and modification of local soil conditions. This species is considered a threat to biodiversity and therefore mitigation measures have been proposed.

3.6.2 Invertebrates

KMBRC returned records of 10 species of invertebrates of conservation concern, the closest of which was for stag beetle (*Lucanus cervus*) approximately 1.1 km south of the site. The woodland habitats on-site are not considered suitable for stag beetle as they lack age structure and buried deadwood features.

The habitats within the wider Bluewater site are considered suitable for supporting a diverse assemblage of invertebrate species, including reedbed on-site. Reedbed has been identified at a County value for its intrinsic value which includes its value to invertebrates.

3.6.3 Amphibians

KMBRC returned records of common toad (*Bufo bufo*), pool frog (*Pelophylax lessonae*), common frog (*Rana temporaria*), palmate newt (*Lissotriton helveticus*), smooth newt (*Lissotriton vulgaris*) and great created newt (*Triturus cristatus*).

The closest record was for smooth newt approximately 380 m south-west of the site within a waterbody at Bluewater. The closest record for great crested newt was approximately 1.7 km south of the site and separated from the site by the A2 and A296, these busy roads are considered significant barriers to dispersal, from data supplied by the records centre.

Great crested newt eDNA surveys were undertaken by Arup in 2019 (Arup, 2019c) of the waterbody south of the site and of waterbodies within Bluewater; these samples all came back negative.

Torch light surveys undertaken by Middlemarch (Middlemarch, 2023d) found populations of smooth newt within Lake 1, 4a and 6 in the Bluewater site and what were believed to be common frog tadpoles. Adult common toads were recorded close to Lake 4a. Great crested newt was not recorded within the Bluewater site.

On the basis of poor habitat suitability, and surveys undertaken by Arup and Middlemarch it would appear that great crested newt is absent from the site.

The woodland, scrub and reedbed habitats on-site are considered suitable for other foraging amphibians including common frog, common toad and smooth newt. Common toad is listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMG, 2006). Reedbed is suitable for breeding common frog and smooth newt.

This site is considered to be of Site level importance for common species of amphibian and so have been Scoped in of further assessment.

3.6.4 Reptiles

KMBRC returned records of slow worm (*Anguis fragilis*), common lizard (*Zootoca vivipara*), adder (*Vipera berus*) and grass snake (*Natrix helvetica*). The closest record was for slow worm approximately 1.42 km north-east of the site.

Previous surveys on-site in 2018 identified a dead grass snake within the woodland on-site and a grass snake was also recorded during surveys in 2019 (Arup, 2019a).

Middlemarch reptile monitoring surveys (Middlemarch, 2023d) found low populations of common lizard and slow worm approximately 250 m south of the site.

The woodland and scrub habitats on-site are considered suitable for hibernating reptiles with log piles present. The reedbed is considered suitable for foraging grass snake. The isolated nature of the site means it is unlikely to support more than a small population of reptiles as evidenced by Middlemarch monitoring surveys, as such reptiles are considered of Site level importance. Reptiles have been Scoped in for further assessment.

3.6.5 Birds

KMBRC returned records of 30 bird species within 2 km of the site (Appendix D Table 12), the closest of which were mainly water birds or gulls from within the Bluewater site and comprised great crested grebe (*Podiceps cristatus*), cormorant (*Phalacrocorax carbo*), grey heron (*Ardea cinerea*), mute swan (*Cygnus olor*), greylag goose (*Anser anser*), Canada goose (*Branta canadensis*), Egyptian goose (*Alopochen aegyptiacus*), water rail (*Rallus aquaticus*), black-headed gull (*Larus ridibundus*), common gull (*Larus canus*), lesser black-backed gull (*Larus fuscus*) and herring gull (*Larus argentatus*). Other species recorded include red kite (*Milvus milvus*), jackdaw (*Corvus monedula*), rook (*Corvus frugilegus*), raven (*Corvus corax*), lesser redpoll (*Carduelis cabaret)* and common crossbill (*Loxia curvirostra*).

The mixed scrub, broadleaved woodland, urban tree, cliff faces and reedbeds at the western portal entrance provide potential habitat for nesting birds. The reedbeds and mixed scrub habitats are suitable for breeding Cetti's warbler (*Cettia cetti*) which have been recorded within the wider Bluewater site and listed on Schedule 1 of the Wildlife and Countryside Act 1981 (HMG, 1981).

The site supports habitats suitable for nesting birds. The habitats here provide a broad range of avian diversity and therefore are considered a Site level of importance. Birds have been Scoped in for further assessment.

3.6.6 Bats

3.6.6.1 KMBRC results

KMBRC returned records of 10 bat species within 2 km of the site, comprising serotine (*Eptesicus serotinus*), Daubenton's bat (*Myotis daubentonii)*, whiskered bat (*Myotis mystacinus*), Natterer's bat (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*), noctule bat (*Nyctalus noctula*), Nathusius' pipistrelle (*Pipistrellus nathusii*),

common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auritus*). The closest record was for Daubenton's bat approximately 200 m south-west of the site within the wider Bluewater site.

3.6.6.2 Arup 2018/2019 results

Swarming surveys undertaken in 2018 identified low numbers of common pipistrelle, Daubenton's bats and brown long-eared bats using Tunnel 1 and Tunnel 2 as a swarming site. During the hibernation surveys in 2018 and 2019, only Tunnel 1 was used by common pipistrelle bats. In terms of summer occupancy, the 2019 activity surveys identified Tunnel 1 and Tunnel 2 used by common pipistrelle, soprano pipistrelle, brown long-eared bats. Tunnel 1 was also recorded as a summer roost for Daubenton's bats. No evidence of roosting bats were recorded in Tunnel 3. No Maternity roosts were identified on-site during these surveys.

3.6.6.3 Habitat enhancement provided on-site

As a result of 2018/2019, findings, bat mitigation was provided in Tunnel 1 to compensate for the loss of roosts within Tunnel 2. These included 15 new roosting features in the form of bat boxes/bat bricks and wooden boards affixed to the walls of the tunnel. Two additional bat boxes were installed within Tunnel 3.

3.6.6.4 Middlemarch 2022 results

The transect survey recorded five species of bat using the Bluewater site including noctule, common pipistrelle, soprano pipistrelle, Daubenton's bat and Natterer's bat. Transect results from near the site recorded a total of 3 common pipistrelle passes.

3.6.6.5 Updated bat surveys

A summary of the bat surveys carried out in 2023/2024 is found below. A detailed breakdown of results from these surveys are available in the Lloydbore Bat Hibernation report (6511-LLB-RP-EC-0001).

3.6.6.6 Preliminary roost assessment

There are approximately 25 roosting features present within Tunnel 1, comprising crevices behind rock-bolts (c.2-3m above ground), bat boxes, gaps behind wooden boards, crevices in the ceiling (c.5-6m above ground) and the chalk substrate of the ceiling allows for free-hanging hibernation. Within Tunnel 2, there are approximately 15 roosting features present within Tunnel 2, comprising the same roosting features as Tunnel 1. Within Tunnel 3 there are limited features available for roosting bats, with only 2 bat boxes established at the tunnel entrance. There are gaps/crevices in the earth spoil at the eastern end of Tunnel 3 and wooden boards have been attached to the tunnel's interior.

3.6.6.7 Swarming Surveys

Tunnel 1 and Tunnel 2

Swarming surveys had low numbers of bats using Tunnel 1 and Tunnel 2. Five species were recorded using the site including; common pipistrelle, soprano pipistrelle, brown long-eared bat and Myotis species (Daubenton's bat and Natterer's bat). Although no swarming occurred whilst surveyors were recording on-site, static surveys identified evidence of common pipistrelle swarming during the October to November survey with a maximum number of 680 passes in one evening. It is considered that this level of activity is indicative of swarming.

Low numbers of brown long-eared bat and Myotis species were recorded during the monitoring period, it is unlikely that swarming by these species occurred during this time period.

Tunnel 3

No bats were recorded swarming around portals to Tunnel 3.

3.6.6.8 Hibernation Surveys

In 2024 in terms of bat hibernation, a greater number of species and abundance was found when compared to the 2019 survey which identified only Tunnel 1 used by hibernating common pipistrelle and concluded Tunnel 2 could be used by hibernating bats due to similar PRF's found in Tunnel 1. The increase in species and abundance of bats is likely due to the habitat enhancement that took place in 2019.

Tunnel 1

Tunnel 1 contained the largest number of hibernating bats with four species recorded across the winter hibernation period using bat boxes and bolt holes including common pipistrelle, soprano pipistrelle, brown long-eared bat, and Natterer's bat. A peak count of six common pipistrelle bats were recorded hibernating on 16 January 2024. In February, two brown long-eared bats were recorded during one site visit with one using a bolt hole and the other using a box. Again, in February, two soprano pipistrelles were recorded during one site visit with one using a bolt hole and the other using a box. A single Natterer's was identified within a bolt hole. Mostly, bats were found hibernating within bolt holes within the tunnel and no bats were observed using the wooded boards.

Tunnel 2

Tunnel 2 was used by common pipistrelle for hibernation. A peak count of 2 bats was recorded on 6 February 2024. A single bat was found recorded on 26 February 2024. These bats were found hibernating within bolt holes located within the western half of the tunnel. A single unidentified Myotis species was recorded during the walkover assessment in October.

Tunnel 3

Tunnel 3 was used a single hibernating bat, Natterer's bat, which was recorded on 16 January 2024. This bat was identified at the eastern end of Tunnel 3 using a hole within the tunnel wall.

3.6.6.9 Emergence Surveys

Tunnel 1

Three brown long-eared bats were recorded using the bat boxes within Tunnel 1 as a day roost on 6 June 2024. No other species were recorded roosting within Tunnel 1. Five species of bat were recorded using Tunnel 1 for foraging and commuting; common pipistrelle, brown long-eared bat and Myotis species. A minimum of 10 individual bats, comprising three brown long-eared bats, five bats of Myotis species and two common pipistrelle bats were recorded using Tunnel 1 to forage/commute.

Tunnel 2

No bats were recorded emerging or roosting within Tunnel 2. Bats were observed passing through the tunnel to forage including common pipistrelle, brown long-eared bat and a Myotis species.

Tunnel 3

No bats were recorded emerging from or using Tunnel 3. All bats were recorded foraging in the adjacent surrounding habitats.

3.6.6.10 Summer roosting

Brown long-eared bats were recorded roosting in bat boxes within Tunnel 1 during the 2024 emergence surveys. No bats were recorded roosting within Tunnel 2 or 3.

Five species of bat were recorded using Tunnel 1 and 2 to socialise and forage including: common pipistrelle, brown long-eared bat, likely Daubenton's bat and Natterer’s bat. No bats were recorded entering or using Tunnel 3.

It is considered unlikely that a maternity roost is present within the tunnels due to the varying climatic conditions within the tunnels and preliminary roosting features (PRFs) present do not provide suitable potential for a maternity roost.

3.6.6.11 Other roosting potential on-site

All trees on-site were young and offered negligible potential for roosting bats. It should be noted that cracks are present on the external cliff face, it is considered that these cracks offer limited suitability for roosting bats and that no presence of roosting bats was identified during the swarming, or emergence surveys undertaken in 2023/2024. No roosting bats were recorded during previous historic surveys (i.e., ARUP transect, swarming or emergence surveys).

3.6.6.12 Valuation for bats

Common and soprano pipistrelle and brown long-eared bats are relatively common and widespread within Kent and across the UK with Daubenton's and Natterer’s bat also being one of the more frequently encountered Myotis species. However, given the rarity of known hibernation roost locations and the number of bats encountered, the tunnels taken together should be considered of County level importance for hibernation.

Due to the unsuitability of maternity roosting within the Tunnels, and only bat boxes within Tunnel 1 being used for summer roosting, the site has been valued as Site level importance.

3.6.7 Hazel Dormouse

Middlemarch undertook hazel dormouse monitoring surveys in 2022 at the Bluewater site (Middlemarch, 2023b). These identified a single hazel dormouse nest along the southern cliffs of the Bluewater site, approximately 400 m south of the site.

KMBRC returned records of hazel dormouse within 2 km of the site, the closest of which was approximately 480 m south-west of the site, recorded within the woodland on top of the cliffs along the southern edge of Bluewater.

Eastern Quarry is known to support populations of hazel dormouse; however, the habitats within the eastern section of the site, within Eastern Quarry are not suitable for hazel dormouse and are not connected to wider habitats.

No evidence of hazel dormouse was recorded on-site and the only potentially suitable habitat on-site was a thin strip of broadleaved plantation woodland at the western portal entrance. The woodland species present were suitable for foraging hazel dormice including Hazel coppice, Oak, and Bramble. However, the woodland lacked structural and species diversity for hazel dormouse. Due to the age trees within the woodland, there was no deadwood with cavities on-site likely to provide suitable summer nesting opportunities for dormice. This habitat was considered suboptimal in terms of hazel dormouse habitat for nesting and cover.

Connectivity between the site and woodland containing hazel dormouse is limited. The cliff face between the woodland and site consists of limited tree and shrub vegetation, creating a sparse link between habitats. The only viable route connecting habitats and the nest site is in the form of a thin strip of scrub with trees situated between the cliff face and Kent Fastway Road. This 200m long strip of woodland consists of a 2m wide mix of scrub and trees. The strip does not provide the same habitat structure compared to the woodland identified as a nesting site and requires hazel dormice to leave suitable habitat making it only accessible for dispersing hazel dormouse.

Due to the limited connectivity to site, it is highly unlikely that the works would affect the favourable conservation status of the hazel dormouse population using the woodland to the south and is therefore Scoped out for further assessment, but mitigation is identified for legal compliance.

3.6.8 Water Vole

KMBRC returned no records of water vole (*Arvicola amphibius*) within 2 km of the site and the aquatic habitats on-site are isolated from suitable habitat and so water vole are considered absent from the site. Water vole is considered absent from the site and has therefore been assessed as having lower than Site value and Scoped out of further assessment.

3.6.9 Otter

KMBRC returned no record for otter (*Lutra lutra*) within 2 km of the site. The habitats on-site are isolated and it is unlikely that otter would be able to reach them through the surrounding urbanised area and roads. Otter is considered absent from the site and has therefore been assessed as having lower than Site value and Scoped out of further assessment.

3.6.10 Badger

KMBRC returned records of badger within 2 km of the site. The closest record was recorded within the site in 2014. No badger setts or other signs of badger activity were recorded on-site. The habitats on-site are of limited suitability for badger and it is considered likely that the badger previously recorded on-site came from the eastern side prior to its clearance and development. As the tunnels are closed with only grilles allowing bats to pass through, badgers are unable to reach the western side of the site through the tunnels. is considered absent from the site and has therefore been assessed as having lower than Site value and Scoped out of further assessment.

3.6.11 Other Mammals

The woodland and scrub within the site are considered to provide suitable habitat for hedgehog. No evidence of hedgehog was recorded on-site and surveys undertaken by Middlemarch in 2022 (Middlemarch, 2023c) recorded no evidence of hedgehog within the Bluewater site and they are considered to be likely absent from the site and are Scoped out of further assessment.

4 EVALUATION

4.1 Potential Ecological Constraints

4.1.1 Ecological Features Scoped Out

The following ecological features have been scoped out as not requiring further consideration with regard to the proposed development on-site (no likely significant effects are anticipated from construction or operation):

- **Statutory designated sites:** The site is not part of, or adjacent to, any site designated for wildlife conservation. There are four statutory designated sites within 2 km of the site comprising SSSIs, National Nature Reserves and Marine Conservation Zones. The closest to the site was Darenth Wood SSSI approximately 0.5 km south-west of the site. No National Site Network sites were identified within 10 km of the site. Due to the distance between the site and the statutory designated sites and the small-scale nature of the proposed development, no effects on statutory designated sites are predicted.

- **Non-statutory designated sites:** There are three non-statutory designated sites within 2 km of the site comprising LWSs and a Woodland Trust Reserve. The closest to the site was Alkerdeen Pit LWS approximately 1.1 km north-east of the site. Due to the distance between the site and the non-statutory designated sites and the small-scale nature of the proposed development, no effects on non-statutory designated sites are predicted.

- **Important habitats:** Eight parcels of Priority Deciduous Woodland habitat were identified within 500 m of the site with the closest approximately 200 m south of the site. A parcel of ancient woodland was identified approximately 470 m south-west of the site. There is only one HPIE on-site which is reedbed. Reedbed has been carried forward in the assessment.

- **Habitats:** Most of the habitats present within the site including urban trees, modified grassland, sparsely vegetated land, and urban-developed lane were considered of negligible value to biodiversity and are scoped out of further assessment. Impacts on HPIE and habitats suitable for supporting protected/ notable species will be discussed within the impacts section for each species.

- **Protected and notable plant species:** The closest record of a notable plant species (Ragged Robin) is located 300m southwest of the site near Lake 4. Although the species was found near the area due for reedbed habitat creation (see BNG report), no vegetation clearance is required on the banks of the Lake and will not result in the loss of species. No impacts are on protected or notable plant species are predicted.

- **Invertebrates:** The habitats within the wider Bluewater site are considered suitable for supporting a diverse assemblage of invertebrate species, but the majority of habitats on-site comprise common and widespread species that are unlikely to be of value to invertebrates. The exception to this is reedbed, which of may be of value to invertebrates. Impacts on reedbed have has been Scoped into the assessment.

- **Great crested newt:** The closest record of great crested newt was over 1 km away and separated from the site by A class roads. Torch light surveys in 2021 and 2022 found no great crested newts within the wider Bluewater site and eDNA surveys of the waterbody within the site in 2019 were negative from within

the Bluewater site. Great crested newt is considered likely absent from the site and no impacts are predicted.

- **Hazel dormouse**: Hazel dormouse is known to be present in woodland on the cliffs approximately 400 m south of the site. Connectivity to the site is limited, however there is a thin strip of scrub with trees between the cliff face and Kent Fastway which could serve as a connecting route to site. However, is unlikely to be used by hazel dormouse and is therefore considered that the site is fragmented and isolated from the woodland with hazel dormouse. Although highly unlikely to be present on-site, the precautionary Ecological Method statement for Vegetation Clearance will be utilised for vegetation clearance for legal compliance.

- **Water Vole:** The site is isolated and unlikely to be accessed by water vole. No impacts on this species are predicted.

- **Otter:** The site is isolated and unlikely to be accessed by otter. No impacts on this species are predicted.

- **Badger:** No evidence of badger was recorded within the site and the former chalk quarry habitats are not considered suitable for sett building. No impacts are predicted.

- **Other Mammals:** The woodland and scrub within the site are considered to provide suitable habitat for hedgehog. No evidence of hedgehog was recorded on-site and surveys undertaken in 2022 recorded no evidence of hedgehog within the Bluewater site. No impacts on this species are predicted.

4.1.2 Ecological Features Scoped In

The following ecological features have been scoped in as needing further consideration with regard to the proposed development (potential for significant effects from construction and/or operation):

- **Habitats:** Reedbed is a HPIE and is present within the site. Without direct compensation for loss of this high distinctiveness habitat there is a risk that the development would be unable to achieve BNG. Further, without additional reedbed planting, water treatment effectiveness will be reduced in lieu of additional traffic using the area.

- **Invasive non-native plant species:** An area of Small-leaved Cotoneaster was recorded adjacent to the western portal entrance (Drawing 2 Appendix A, TN5 Appendix B) and will be cleared within the proposals. In the absence of mitigation, the works have the potential to spread this species during construction, resulting in potential establishment during the operational phase.

- **Other amphibians:** Common frog, toad, smooth newt have been recorded within the site. There is potential for these species to breed, forage and hibernate within habitats on-site**.** In the absence of mitigation, the works have the potential to negatively impact these species.

- **Reptiles:** Slow worm and common lizard have been recorded approximately 250 m form the site and grass snake has been recorded within the site. In the absence of mitigation, the works have the potential to negatively impact these species.

- **Birds:** The areas of scrub, woodland and reedbed present on-site are considered likely to support nesting birds. Vegetation clearance on-site will reduce nesting and foraging habitat for birds and has the potential to negatively impact bird species in the absence of appropriate mitigation.

- **Bats – Hibernation roosting:** Bats were identified within the site, using all three tunnels for hibernation and swarming activity was recorded at Tunnels 1 and 2. Vibrational and noisy works during the winter period are anticipated to have a potential negative impact on swarming activity and hibernating bats. In the absence of mitigation, it is considered that drilling works have the potential to negatively impact hibernating bats in all tunnels on-site during construction.

- **Bats – Summer roosting:** No maternity roosting has been identified on-site. Emergence surveys undertaken recorded several species using Tunnel 1 for summer roosting, including 3 brown long-eared bats using the tunnel as a day roost. No bats were recorded emerging or roosting within Tunnel 2, although it is used for foraging / commuting. It is anticipated that during construction works Tunnel 2 will be used for pedestrian access and light plant use, accessing east and west of the site. In the absence of mitigation regarding lighting, noise and timing works, it is considered that potential indirect impacts to bats may occur during the construction phase.

4.2 Summary of Scoped In Values

Table 6 summarises relevant ecological features and the geographical context in which each is considered to be important in relation to the site (IEFs).

Table 6: Relevant ecological features and their geographical importance

Ecological Feature	Importance
Reedbeds	County
Invasive Non-native Plant Species	A threat to biodiversity
Other amphibians	Site
Reptiles	Site
Birds	Site
Bats (Hibernation roosting)	County
Bats (Summer roosting)	Site

5 ECOLOGICAL IMPACT ASSESSMENT

5.1 Overview

The sections below discuss constraints, potential impacts, mitigation and enhancement opportunities for relevant important ecological features, which include protected and notable species and habitats. Where mitigation and enhancements are required to fulfil legal and policy constraints, these are discussed more fully in Section 6.4.

5.1.1 Mitigation hierarchy

Where possible, the development should satisfy the requirements of the 'mitigation hierarchy' with regard to impacts on ecological feature, through the following stepwise approach:

- Avoidance of impacts to wildlife and habitats e.g., by designing the layout to avoid ecological receptors;
- Mitigation, where significant harm cannot be entirely or partially avoided e.g., through the creation of alternative habitats elsewhere on-site; and
- Compensation, where significant residual harm is offset e.g., through the provision of an equivalent or greater value of biodiversity.

5.1.2 Construction Environmental Management Plan (CEMP)

The CEMP that is to be completed by the contractor and is anticipated to be required to be approved by the Local Planning Authority (LPA) prior to commencement of works will outline the standard pollution control measures that will be implemented during the construction phase to ensure that retained and off-site habitats are protected. This will ensure that retained on and off-site habitats are protected from dust, airborne pollutants and sediment laden surface water runoff. All retained habitats (including the root protection areas of trees and hedgerow) will be protected using fencing, where necessary, during construction to ensure no accidental damage from machinery and personnel.

There is an element of embedded mitigation built into the programme and layout, such as initial design discussions to place the development in areas that primarily avoid key habitat. The requirement for toolbox talks will be in the CEMP, with the specific details to be confirmed once a contractor is appointed, and the enabling works programme is finalised.

5.1.3 Landscape and Ecological Management Plan (LEMP)

The LEMP outlines the mitigation measures required with regard to legal compliance. This will be completed with reference to the proposed construction programme and will be incorporated into the CEMP.

5.2 Impacts and Mitigation

5.2.1 Summary of Impacts

The following IEFs (Table 7) have been scoped into the assessment as there is potential for an adverse significant effect due to their presence and potential impacts.

The development of Bean Tunnel and associated infrastructure is anticipated to take a maximum of 15 months to complete, with a commencement date of March 2025.

Table 7: Features scoped in.

Important Ecological Feature	Scoped in for construction and / or operational phases?	Potential impact pathways during construction	Potential impact pathways during operation
Habitats: Reedbed	Construction and Operational	• Removal of HPIE without compensation • Removal of habitat used by species • Pollution from construction activities	• Scrub encroachment • Reduction in water treatment effectiveness within the area
Invasive non-native plant species - Small-leaved Cotoneaster	Construction and Operational	• Spread of invasive species	• Establishment of species throughout the site
Other Amphibians	Construction and Operational	• Direct mortality of frog, toad, and smooth newt through destruction of habitat on-site	• Reduction of available habitat for these species
Reptiles	Construction and Operational	• Direct mortality of reptiles through destruction of habitat on-site • Disturbance of reptiles surrounding the site	• Reduction of available habitat for protected species.
Birds	Construction and Operational	• Destruction of nests through clearance of vegetation on-site	• Reduction in available mature vegetation for nesting birds
Bats (Hibernation and Summer roosting)	Construction and Operational	• Indirect disturbance in the form of light, noise, and dust from pedestrian and light plant activity to bats using Tunnel 2 for roosting and hibernating. • Noise, light and dust impacts from construction to all Tunnels. • Vibration from drilling new tunnel impacting roosts within all Tunnels. • Removal of vegetation around Tunnel portal to reduce connectivity from the Tunnels to the wider landscape	• Lack of available habitat for commuting and foraging within the vicinity of tunnels

5.2.2 Reedbed

5.2.2.1 Reedbed - Effect of impacts

An area of reedbed within the site will be cleared for construction and is categorised as HPIE under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006). Habitat cleared for works will also have a temporary impact on a range of species that rely on this habitat (i.e., invertebrates, other amphibians, and birds) before it recovers. There is a risk of pollution events during construction which could change the species assembly or reduce water quality, impacting existing reedbed.

Following construction and during operation there is a risk that scrub encroachment on to open water in areas of reedbed removal could lead to a reduction in reedbed on-site. This could result in a change the habitat to wet woodland resulting in successional species outcompeting reedbed species. The removal of reedbed would also decrease the effectiveness its water treatment capability, resulting in increased pollution within the area over time.

5.2.2.2 Reedbed - Mitigation

Under the Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006) relevant authorities have a duty to take action to conserve and enhance reedbeds as a HPIE. This could involve implementing measures to protect the plants' habitats, and controlling activities that may harm the species. A suitable pollution control mechanism for pollution events will be carried out on-site to contain pollution from entering into nearby waterbodies.

The drivers for ensuring impacts to this habitat are limited has included proposed design features that help reduce its clearance extent and providing compensation for habitat loss nearby in the form of reedbed habitat creation (Drawing 4, Appendix C). Furthermore, as this habitat constitutes as a high distinctiveness habitat within the BNG metric, habitat creation proposals have been provided to ensure no net loss to biodiversity and that trading rules for the loss of this habitat are satisfied. The provision of additional reedbed planting within the area will also support multiple species that rely on the habitat and increase effectiveness of water treatment capability. Created habitat to be managed in accordance with LEMP.

To ensure scrub establishment is contained following construction, active management of scrub around reedbed areas will be required. Any open water resulting from reedbed removal will be re-planted with reedbed and any scrub in the vicinity cut back.

5.2.2.3 Reedbed - Significance of Residual Effects

Direct compensation in the form of reedbed habitat creation will ensure the more habitat is created than lost, following construction. The significance of loss has been taken into account using the BNG metric and taking into account amount of habitat creation proposed a BNG positive score has been met, and trading rules satisfied. The additional habitat will also negate the negative impacts on other species due to habitat loss. Further, the additional pollution run-off from caused by vehicles using the tunnel will be mitigated during the operational phase through the provision of reedbed planting ensuring the water treatment effectiveness in the area.

Provided that the extent of habitat creation is carried out as detailed within the BNG metric, pollution control measures put in place, and active management of scrub carried out, it is anticipated that residual effects on this HPIE would be considered to be Not Significant.

5.2.3 Small-leaved Cotoneaster

5.2.3.1 Small-leaved Cotoneaster – Effect of impacts

A patch of Small-leaved Cotoneaster approximately 4x4 m that was recorded at the base of the western cliffs (Drawing 2 Appendix A, TN5 Appendix B) will be cleared under the proposals. This species is listed as a non-native invasive species on Schedule 9 of the Wildlife and Countryside Act 1981 (HMG, 1981). There is a risk that clearance of this species during construction could result in its spread into nearby native habitats. As this species is considered a threat to biodiversity, the establishment of this species within nearby areas would result in the degradation of native habitats.

5.2.3.2 Small-leaved Cotoneaster - Mitigation

Small-leaved Cotoneaster will be removed by a specialist contractor following the Ecological Method statement for Vegetation Clearance and the Construction Environmental Management Plan (CEMP) for the proposed development.

5.2.3.3 Small-leaved Cotoneaster - Significance of Residual Effects

The potential spread of this invasive species without following requirements set out in the Ecological Method statement for Vegetation Clearance could result local spread during removal and potential establishment during operation. With the application of measures during construction residual effects on invasive non-native species would be considered to be Not Significant.

5.2.4 Other Amphibians

5.2.4.1 Other Amphibians – Effect of impacts

The woodland, scrub and reedbed habitats on-site are considered suitable for other foraging amphibians including common frog, common toad and smooth newt. Reedbed is suitable for breeding common frog and smooth newt. The removal of this habitat could result in the direct mortality of common frog, common toad, and smooth newt through destruction of habitat on-site. Further, if habitat on-site is not provided following construction, then the reduction of habitat availability in the area would result in lower occurrences of these species due to the reduction in breeding, foraging, and hibernating.

5.2.4.2 Other Amphibians – Mitigation

Sensitive clearance of habitats suitable for supporting other amphibians should be undertaken following the Ecological Method statement for Vegetation Clearance. and under ecological oversight. A monitored, three-stage approach to vegetation removal is recommended which diminishes the suitability of the works area to encourage the movement of amphibians to other nearby suitable habitats. This should take place when amphibians are active to avoid disturbing hibernating animals (April to September, but ideally September to coincide with nesting birds and other species on-site). By following requirements set out in the Ecological Method Statement for Vegetation Clearance, impacts should be avoided to amphibians, therefore negating the need for further surveys or a translocation and exclusion of work areas.

It is also recommended that at least one artificial hibernation site (hibernacula) is created before the autumn. The felled trees will be used as log piles to provide habitat for amphibians using the site until planting develops (See Appendix C Drawing 5 for example of hibernacula). The details of the creation of hibernacula should be incorporated into the CEMP for the proposed development.

Planting habitat suitable for amphibians following construction will provide mitigation for the loss of habitat as this planting matures during the operational phase.

5.2.4.3 Other Amphibians – Significance of Residual Effects

Site clearance within site could result in negative impacts during the construction phase without following procedures set out in the Ecological Method statement for Vegetation Clearance. During the operational phase, the decrease in habitats suitable for other amphibians will generate a negative significant residual effect at site level until the new planting establishes. Ensuring that the Ecological Method Statement for Vegetation Clearance guidance is followed during construction and log piles provided on-site, any residual effects will be negated to other amphibians. It is therefore considered that impacts to other amphibians would be Not Significant for both the construction and operational phases.

5.2.5 Reptiles

5.2.5.1 Reptiles – Effect of impacts

The woodland and scrub habitats on-site are considered suitable for hibernating reptiles with log pile presents. The reedbed is considered suitable for foraging grass snake. The removal of areas of suitable habitat has the potential to harm reptiles and reduce suitable habitat areas. If habitat on-site is not provided following construction, then the reduction of habitat availability in the area would result in lower occurrences of reptiles due to the reduction in breeding, foraging, and hibernating.

5.2.5.2 Reptiles – Mitigation

Sensitive clearance of habitats suitable for supporting reptiles should be undertaken following the Ecological Method statement for Vegetation Clearance and under ecological oversight. Given the low numbers of reptiles recorded from the desk study and previous surveys, a monitored, three-stage approach to vegetation removal is recommended. This approach diminishes the suitability of the works area to encourage the movement of reptiles to other nearby suitable habitats. This should take place when reptiles are active to avoid disturbing hibernating animals (April to September, but ideally September to coincide with nesting birds and other species on-site). By following requirements set out in the Ecological Method Statement for Vegetation Clearance, impacts should be avoided to reptiles, therefore negating the need for further surveys or a translocation and exclusion of work areas.

It is also recommended that at least one artificial hibernation site (hibernacula) is created before the autumn. The felled trees will be used as log piles to provide habitat for reptiles using the site until planting develops (See Appendix C Drawing 5 for example of hibernacula). The details of the creation of hibernacula should be incorporated into the CEMP for the proposed development.

Planting habitat suitable for reptiles following construction will provide mitigation for the loss of habitat as this planting matures during the operational phase.

5.2.5.3 Reptiles – Significance of Residual Effects

Site clearance within site could result in negative impacts during the construction phase without following procedures set out in the Ecological Method statement for Vegetation Clearance. During the operational phase, the decrease in habitats suitable for reptiles will generate a negative Significant residual effect at site level until the new planting establishes. Ensuring that the Ecological Method statement for Vegetation Clearance guidance is followed during construction and log piles provided on-site, any residual effects will be negated to reptiles. It is therefore considered that impacts to reptiles would be Not Significant for both the construction and operational phases.

5.2.6 Birds

5.2.6.1 Birds – Effect of impacts

The removal of scrub, woodland and reedbed has the potential for damaging or destroying active birds' nests and/or eggs during the construction phase. The removal of nesting habitat will result in a negative impact for bird nesting and foraging during operation until replacement planting is established (approximately 10 years).

5.2.6.2 Birds – Mitigation

The scrub, woodland and reedbeds on-site were considered likely to support nesting bird species during the breeding season. The main breeding season for most UK species runs from March to August (inclusive) therefore it is recommended that all vegetation clearance works be undertaken outside of this time period.

If vegetation clearance works are required within the main nesting season, then a nesting bird check should be undertaken by an ecologist no more than 48 hours prior to the works being undertaken (preferably within 24 hours). If an active nest is found during the check, the ecologist will advise on establishing an exclusion zone around the nest. This must remain in situ until the chicks within the nest have fledged. The procedure has been detailed in Ecological Method statement for Vegetation Clearance and will be incorporated into the CEMP.

To negate impacts of reduced nesting habitat during the operational phase (particularly between removal of existing trees, and maturation of planted trees) it is recommended that bird boxes are provided on existing trees within site and the surrounding Bluewater area prior to vegetation clearance. An example nest box to be used includes the Schwegler Next Box 1B[1].

5.2.6.3 Birds - Significance of Residual Effects

Removal of vegetation within the nesting bird season could present a risk to bird species in the construction phase. During the operational phase, the decrease in bird foraging and nesting opportunities will generate a negative Significant residual effect at site level. As bird boxes are being provided to increase nesting opportunity until planting on-site matures, the residual effect on nesting birds would be Not Significant throughout construction and operational phases.

5.2.7 Bats

5.2.7.1 Bats (Hibernation and Summer roosting) – Effect of impacts

All tunnels were used by hibernating bats, with the highest number of bats using Tunnel 1. Tunnel 2, which is nearest to the proposed works, was used by one species of bat for hibernation; common pipistrelle. A single Natterer's bat was recorded roosting during the hibernation period in Tunnel 3. It is considered that there is potential for bats to be impacted by vibrational activity when they are most sensitive to disturbance; during hibernation period (approximately November to February, inclusive). Disturbing bats during hibernation can lead to adverse impacts on their survival and ability to successfully reproduce, impacting the favourable conservation status on bats present on-site.

No summer roosting activity was recorded during the emergence surveys at Tunnel 2, which is nearest to the proposed works. During the emergence surveys Tunnel 1, located 50 m to the south of Tunnel 2, was found to have five species of roosting bat. No bats were recorded emerging from or using Tunnel 3.

[1] https://www.schwegler-natur.de/portfolio_1408366639/nisthoehle-1b/?lang=en

In the absence of mitigation, undertaking works such as drilling during the bat active season (May – September inclusive) is also considered likely to affect bats by disrupting foraging, commuting, and roosting behaviours.

During construction, site teams will use Tunnel 2 for pedestrian and light plant access between the Eastern and Western Quarries. This tunnel was found to support hibernating common pipistrelle which may be disturbed by pedestrian and light plant use during construction. It is therefore likely that disturbance to bats will be caused by light and noise from workers. The tunnel will also be lit during construction, potentially deterring bats from using the tunnel for roosting. Furthermore, evidence of swarming around Tunnel 1 and 2 has been recorded. Light spill onto the portal entrances may deter bats from swarming in in this area.

Before drilling works can commence, protective rock netting will be installed on both the eastern and western rock faces. The rock element of the cliff face is unlikely to support roosting bats due to the nature of the rock and unstable climatic conditions. It is considered that cracks on the external cliff face offer limited potential to roosting bats.

5.2.7.2 Bats (Hibernation and Summer roosting) – Mitigation

Noise and vibration

Bats in all tunnels may be subject to potential indirect impacts such as vibration noise and light. As a result, the drilling aspects (installing rock netting, and main tunnel drilling) of construction should seek to avoid the hibernation period (November to February, inclusive). It is advised that works are undertaken in less sensitive periods such as March/April and during the active bat season (May-September).

Lighting

It's likely that to ensure safety and security during the construction phase, additional lighting will be required to facilitate works in Tunnel 2. It is anticipated the no lighting is required to facilitate the proposed development within Tunnel 1 or Tunnel 3.

For lighting required in Tunnel 2 for pedestrian and light plant use, it is proposed that motion sensor lighting or a timer is used to minimise potential impact to bats. This type of lighting would be activated via motion and turn off after a short period of time of inactivity. Motion activated sensors could be installed at set intervals throughout the tunnel and be lit at levels no greater than 5 lux. Regarding the colour of lighting used, there is evidence to suggest common pipistrelle species are unaffected by white light, however it is recommended that headlights utilised on-site have a red-light setting which can be used if required. External lighting design for Tunnel 2 will should be consulted with the ecologist in order to mitigate the effects of lighting on the tunnels and the surrounding habitat.

In order to minimise potential adverse lighting impacts to bats, night working should be avoided, where possible. If nighttime working is required to facilitate the construction of the proposed development, then task-based lighting may be required. Task-based will be inward facing to avoid light spill to areas outside of the works footprint and therefore minimising the potential for negative impacts to bats. Lighting cowls will be utilised to further reduce light spillage to areas outside of the works footprint. It is advised that no lighting at the entrance of the tunnels is permitted.

Night working

Night work should be avoided, where possible, during hibernation period (November – February, inclusive) and swarming (October-November). If nighttime working is required, then ecologist should be consulted on the use of short-term duration task-based lighting to minimise potential impacts to bats. Lighting at tunnel entrances should be avoided through-out the construction phase.

Compensation

All roosting features present within the tunnels will be retained, it is anticipated that no roosting features will be directly impacted / lost. However, it is considered that indirect impacts such as noise, light and vibration may result in disturbance to these roosting features. As Tunnel 2 will be temporarily used as a pedestrian and plant access, it is considered that roosts may be subject to potential indirect impacts, however Tunnel 1 and Tunnel 3 will be retained for bats and therefore offer suitable alternative roosting locations for bats. Within Tunnel 1 and 2, it is proposed that artificial roosting features will be installed prior to construction to provide compensatory roosting sites for bats potentially disturbed by the works undertaken in Tunnel 2. Tunnel 2 will also be provided with bat boxes, but only after the proposed development has entered its operational phase.

Example artificial bat features include Schwegler Brick Box Type 25A[2] or Schwegler Flat Bat Box 1FF[3].

Table 8 details required features including when each should be installed. The number of bat boxes provided within tunnels was determined based on current and potential use of tunnels follow operation.

Table 8: Artificial roosting features for bats to be provided on-site

Tunnel	No. Bat boxes to be installed	No. Cladding to be installed	Phased install period
1	10	2	Prior to construction
2	5	2	Following construction
3	5	2	Prior to construction

Tunnel 1 will be retained and safeguarded to protect bats and their roosts, with mitigation features installed as mentioned above. A fence and gate will be put in place at the portals of Tunnel 3 to prevent unauthorised entry while enabling access for monitoring. Meanwhile, the Tunnel 2 portal will be sealed with a gap fitted with grilles to deter human access while facilitating bat entry and exit. In terms of planting two new trees will be provided adjacent to Tunnel 1 and 2.

Monitoring

To ensure that the proposed mitigation and compensation is effective in maintaining the favourable conservation status of bat using the site during construction and operation, monitoring of the tunnels is recommended. It is advised that a suitably qualified and licensed bat ecologist undertake regular checks of roosts within the tunnels to ensure consistent use throughout construction to ensure that there are no adverse impacts during this period.

Following construction, post-development surveys will be undertaken to ensure compensation is effective. This will include 2 yearly bat monitoring years within a 5-year period. These years will be staggered throughout that time (e.g., years 2 and 4). If in one of these years swarming was recorded then there would be a minimum of three years post-development monitoring, staggered within a ten-year period.

Licensing

A European Protected Species Mitigation (EPSM) licence will be required from Natural England for the works. Although the works will not result in the loss of roosts, a licence will be required due to the potential indirect impacts to hibernating bats. As part of the EPSM licence application, a comprehensive mitigation plan to

[2] https://www.schwegler-natur.de/portfolio_1408366639/nist-einbaustein-25a/?lang=en
[3] https://www.schwegler-natur.de/portfolio_1395072079/fledermausflachkasten-1ff/?lang=en

reduce negative effects on bats will be established and legally enforced. All outlined measures for reducing and compensating impacts in the licence application will be committed to.

5.2.7.3 Bats (Hibernation and Summer roosting) – Significance of Residual Effects

A combination of mitigation measures will be utilised to minimise disturbance to bats during construction. Measures will also be put in place to provide additional roosting features for bats prior construction to increase the carrying capacity for bats using the tunnels for hibernation. To ensure disturbance after construction is completed is kept to a minimum, all tunnels will be retained and safeguarded for the protection of bat roosts. The mitigation measures will mean the residual effect on bats would be Not Significant at all stages of construction, and operation, ensuring this important hibernation roost site is retained.

5.2.8 Hazel dormouse

5.2.8.1 Hazel dormouse – Precautionary mitigation

Although not expected to be present on-site, precautionary measures dictate that the removal of scrub and woodland habitats during construction has the potential to harm hazel dormouse and their nests.

An Ecological Method statement for Vegetation Clearance has been produced to ensure the works avoid potential incidental injury or killing of hazel dormice. All vegetation clearance works will be undertaken under the supervision of a suitability qualified ecologist. The mitigation strategy comprises the following key elements:

- Vegetation clearance to take place outside of the hibernation period (April to September) to avoid disturbing hibernating animals,
- Finger-tip searches of scrub and lower parts of the tree canopy will be carried out by a suitably qualified ecologist before any vegetation clearance takes place,
- In the event that a hazel dormouse nest or a hazel dormouse is discovered the works will need to cease immediately and advice to be sought from the ecologist who will determine the appropriate approach.

As part of the landscape proposals, planting native trees and scrub will provide habitat suitable for hazel dormouse.

6 LEGISLATION AND POLICY COMPLIANCE

6.1 Legislation

This assessment has been undertaken in accordance with current national legislation, national planning policy, local plans and policies relating to biodiversity in the context of the Proposed Development. A summary of the relevant legislation and the requirements of these policies is provided below.

6.2 Relevant Legislation

The following legislation (Table 9), relevant policy and guidance for site location (Table 10), and for species on-site (Table 11) has been considered with regard to the methodology and assessment included in this report.

Table 9: Relevant legislation

Legislation	Details
Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ('Habitats Regulations') (HMG, 2021)	The Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for either habitats or species (National Network Sites – Special Areas if Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning and other controls. The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licences by the appropriate authorities (Natural England in England). Licences may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.
The Wildlife and Countryside Act 1981, as amended (HMG, 1981)	The Act is the main mechanism for legislative protection of wildlife in England. It gives protection to native species (particularly threatened species), their resting places and places of shelter by making it an offence to kill, injure, take, damage, destroy, sell or possess them (with exceptions).
Countryside and Rights of Way Act 2000 (HMG, 2000)	The Act places a duty on government departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity. It also strengthens legal protection for species considered to be threatened under the Wildlife and Countryside Act 1981 and increases powers for the protection and management of Sites of Special Scientific Interest (SSSI).
The Natural Environment and Rural Communities (NERC) Act 2006 (HMG, 2006)	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna and habitats (previously UK Biodiversity Action Plan (BAP) habitats and species) and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Legislation	Details
The Invasive Alien Species (Enforcement and Permitting) Order 2019 (the Invasive Species Order') (HMG, 2019)	This order strengthens the legislation in relation to widely spread species of European Union concern; requiring effective management measures to be put in place to minimise their impacts. It is an offence to import, keep, breed / grow, transport, sell, use, allow to reproduce, or release into the environment the species listed in Schedule 2 of this Order.
The Environment Act 2021 (HMG, 2021)	In line with the 25 Year Plan for the Environment (HM Government, 2018), new development should identify and pursue opportunities for securing measurable net gains for biodiversity and for the wider environment. The Environment Act 2021 introduces a mandatory requirement for 10% biodiversity net gain for new developments to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. Integrating biodiversity net gain into the planning system will provide a step change in how planning and development is delivered. There is also a strong focus on delivering environmental net gain. This would preferably be achieved on-site, however there are options to deliver these gains off-site and this would be demonstrated via the Statutory Biodiversity Metric (DEFRA, 2023).

6.3 Relevant Policy for site location

Table 10: Relevant policy

Policy / Guidance	Details
The Kent Biodiversity Strategy 2020 to 2045 (Kent Nature Partnership, 2020)	The Kent Biodiversity Strategy centres on specific priority habitats and species, establishing goals and benchmarks for their enhancement. When assessing development plans, the Council will prioritize the conservation and potential enhancement of these crucial habitats and species. The Strategy looks to protect and recover threatened species and enhance the wildlife habitats that Kent is particularly important for. Additionally, it aims to create a natural environment that encourages community involvement, fostering appreciation and utilization, thereby allowing the people of Kent to experience the mental and physical health benefits of connecting with nature. This will be achieved through the delivery of the following goals in Kent for 2045: • *A rich and growing terrestrial biodiversity, underpinned by more resilient and coherent ecological networks and healthy, well-functioning ecosystems.* • *Clean, plentiful and biologically diverse freshwater and intertidal ecosystems underpinned by implementation of a catchment-based approach.* • *A reverse in the loss of marine biodiversity and delivering clean, productive and biologically diverse oceans and seas through good management.* • *The widest possible range of ages and backgrounds will be benefiting from the mental and physical health benefits of the natural environment; and we will have inspired the next generation to take on guardianship of the county's biodiversity.*
The Dartford Plan Dartford Borough's Local Plan to 2037 Adopted 2024 (Dartford Borough Council, Adopted April 2024)	The Dartford Plan is a long-term strategy that constitutes the Development Plan for the County Borough Council. One of its four main Strategic Objectives which focuses the delivery of the Local Plan sets out objectives for a green and attractive environment. A key policy (M14) aims to ensure the protection and enhancement of a number of conservation sites that fall within the Borough which are designated as being of national or local importance.

Policy / Guidance	Details
	Further, the M14 policy references the importance of wetland habitats within the Borough and specifies areas of Biodiversity Opportunity Areas (BOAs). One of these is situated within the Bluewater site as it was identified as having have good potential for biodiversity improvement and for connecting nature conservation sites, habitats and species. A key attribute of the policy aims to seek avoidance strategies to limit any adverse impacts on existing biodiversity features, including designated sites, priority habitats and species, and waterbodies.
National Planning Policy Framework (NPPF) 2023 (HMG, 2023)	The NPPF sets out how the planning system should protect and enhance nature conservation interests. Section 15 is concerned with conserving and enhancing the natural environment (paragraphs 174 to 182). Planning policies and decisions should contribute to and enhance the natural and local environment by: • *Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);* • *Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; and* • *Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.* To protect and enhance biodiversity and geodiversity, plans should: • *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and steppingstones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and* • *Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity and take opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.* When determining planning applications, local planning authorities should apply the following principle: • *Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.*

6.4 Relevant Policy for species identified on-site

Table 11: Relevant Policy for species identified on-site

Species	Details
Invasive non-native species - Small-leaved Cotoneaster	Schedule 9 of the Wildlife and Countryside Act 1981 (as amended; (HMG, 1981) lists non-native species that are already established in the wild, which continue to pose a conservation threat to native biodiversity and habitats, so that further releases should be

Species	Details
	regulated. A species listed under Schedule 9 is Small-leaved Cotoneaster. Ensuring the removal of this species does not relate to further spread will mean works will comply with this legislation.
Habitats: Reedbeds	Reedbed is categorised as a priority habitat under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (HMG, 2006). If a plant species is designated as a priority species, it means that the relevant authorities have a duty to take action to conserve and enhance the species. This could involve implementing measures to protect the plants' habitats, controlling activities that may harm the species, and promoting public awareness and understanding of the importance of conserving these plants.
Reptiles	All UK species of reptile are protected from harm under the Wildlife and Countryside Act 1981 (as amended; (HMSO, 1981)), making it an offence to kill or injure these species. Reptiles are also considered Species of Principal Importance in England (SPIEs) in England (HMSO, 2006). Retaining suitable habitat for these species will comply with this legislation.
Birds	All wild birds in the UK are protected from killing and injury, and against the destruction of eggs and active nests, under the Wildlife and Countryside Act 1981 (as amended; (HMSO, 1981)). Undertaking vegetation clearance outside of the breeding bird season or providing pre-clearance nest checks (within 48 hours prior to clearance) will comply with this legislation. Many birds are also SPIEs in England (HMSO, 2006) and as such their presence needs to be considered by the local authority when planning works.
Bats	All bats and their resting places in the UK are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMG, 2021) and the Wildlife and Countryside Act 1981 (as amended; (HMG, 1981)). It is an offence to disturb a roosting bat or destroy a bat roost (whether bats are roosting at the time or not). They are also covered by the Wild Mammals (Protection) Act 1996 (HMG, 1996), which prohibits cruel treatment. Some bat species are also SPIEs in England (HMG, 2006). Retaining foraging habitat and commuting links will comply with this guidance.
Hazel dormouse	Hazel dormouse is a protected species in the UK under the Wildlife and Countryside Act 1981 (as amended; (HMG, 1981) and Conservation of Habitats and Species Regulations (Amendment) (EU Exit) 2019, as amended ('Habitats Regulations') (HMG, 2021). These regulations make it an offense to intentionally or deliberately capture, kill, disturb, or injure hazel dormice, as well as damage or destroy their breeding or resting places. Additionally, their habitats are protected under these regulations, and it is illegal to damage or destroy any such habitat.

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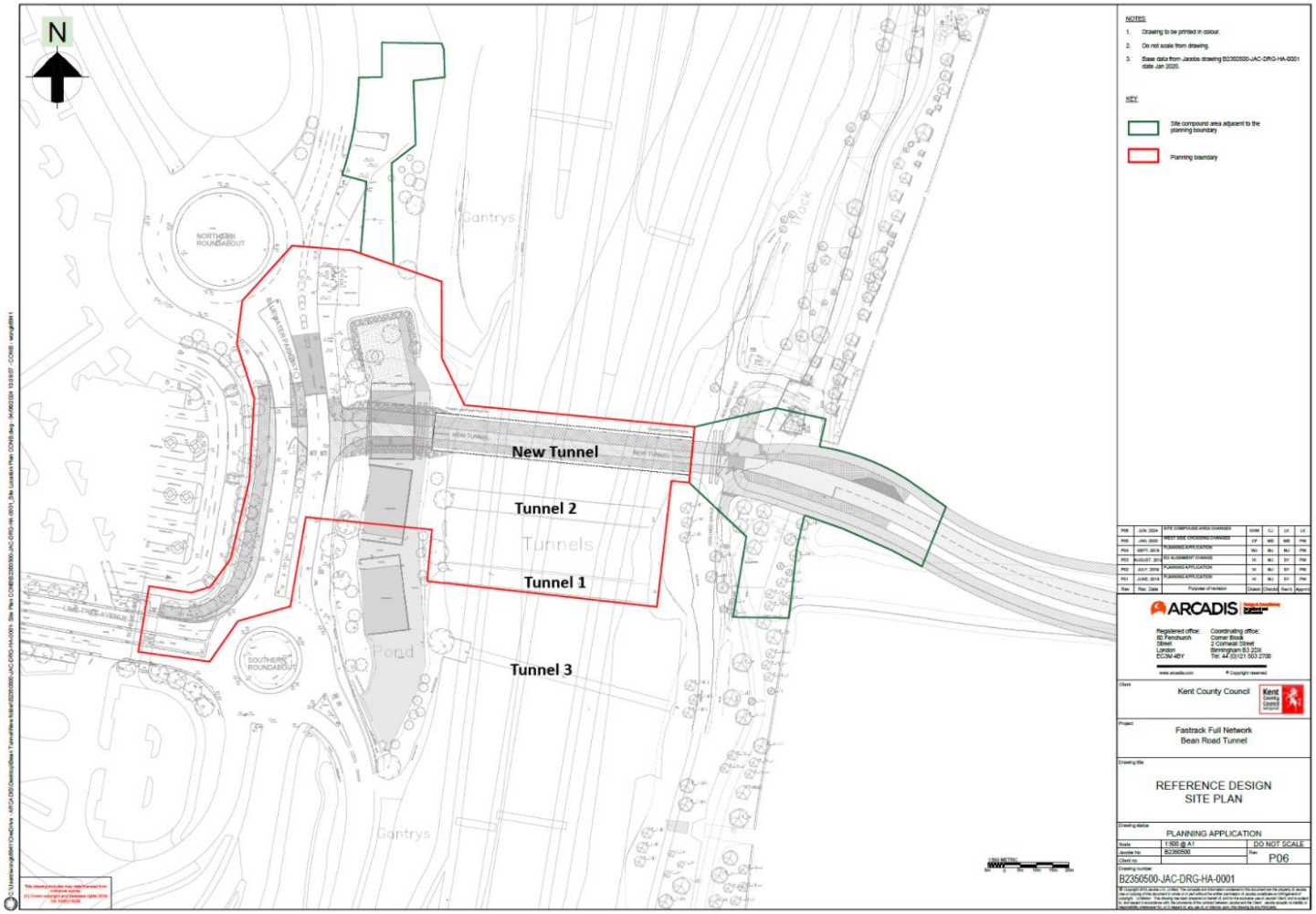
Appendix A

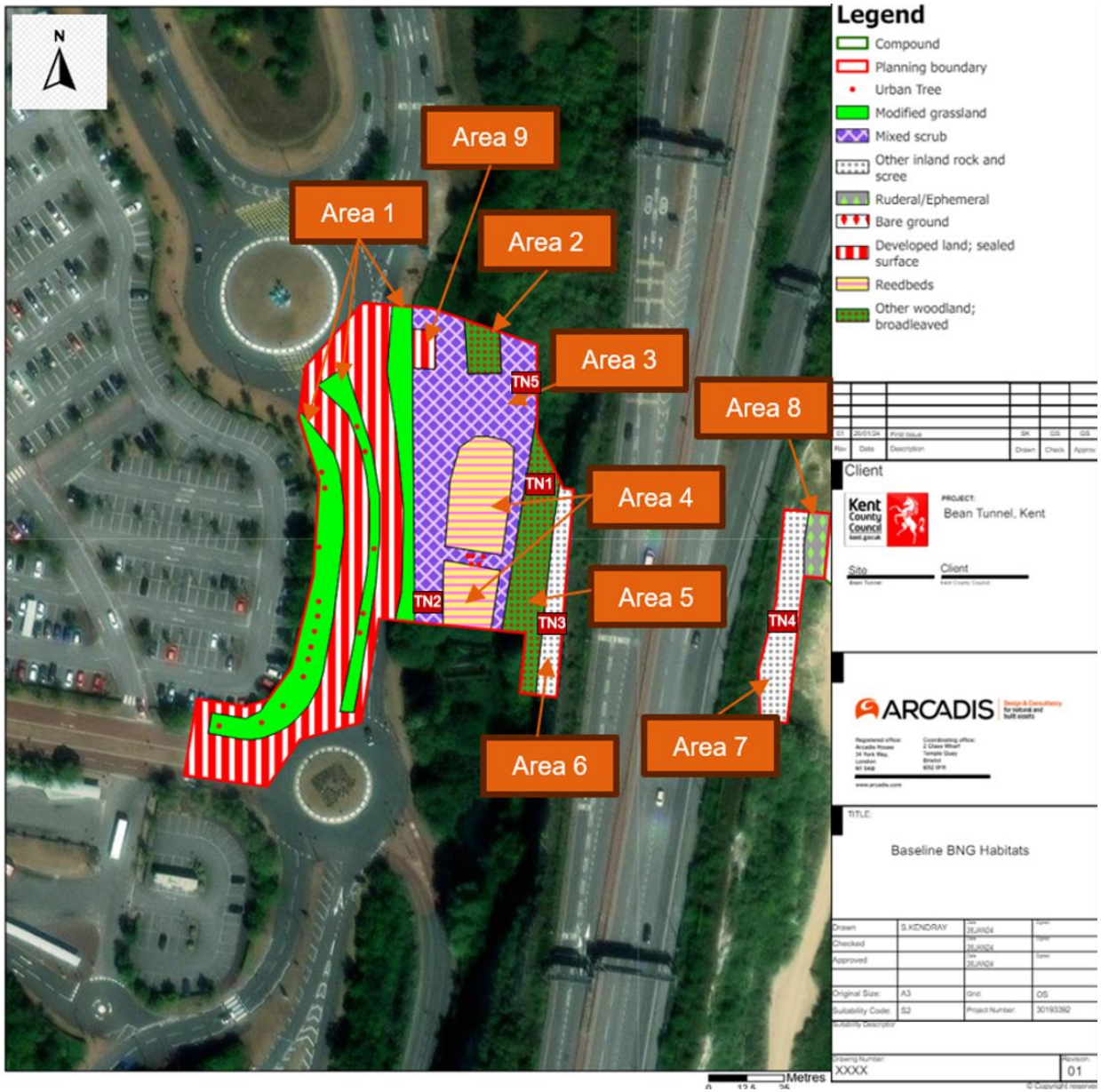
Drawings

Drawing 1: Site location, planning application boundary and tunnel locations



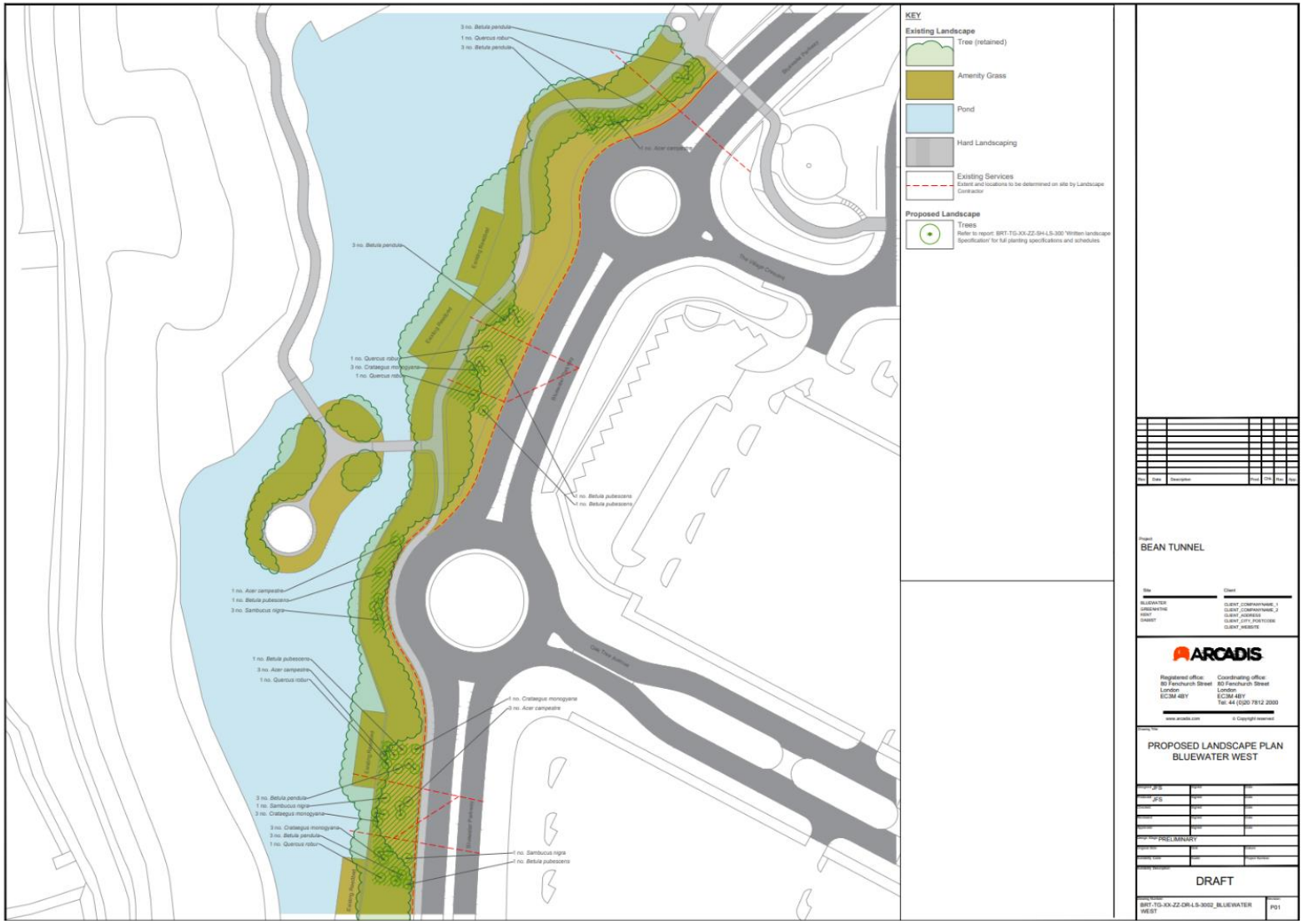
Drawings

Drawing 2: PEA Survey Plan with target notes



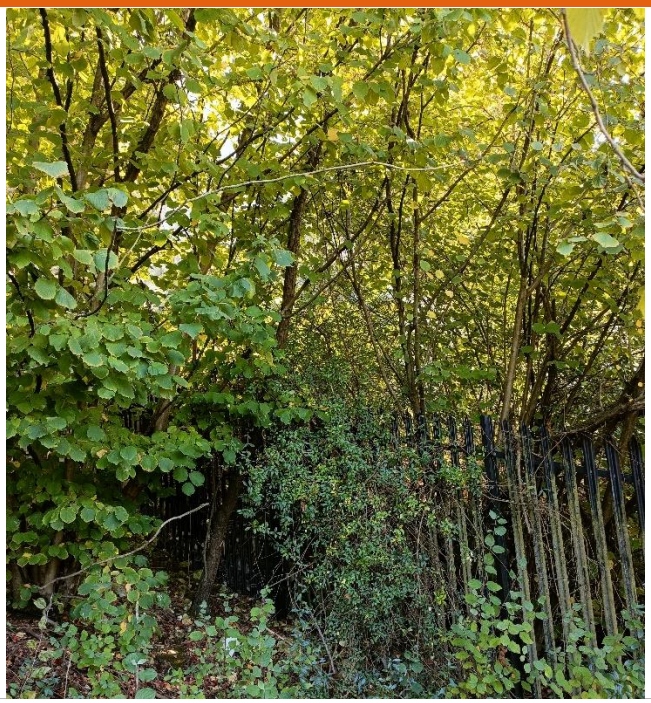
Drawings

Drawing 3: Previous compensation

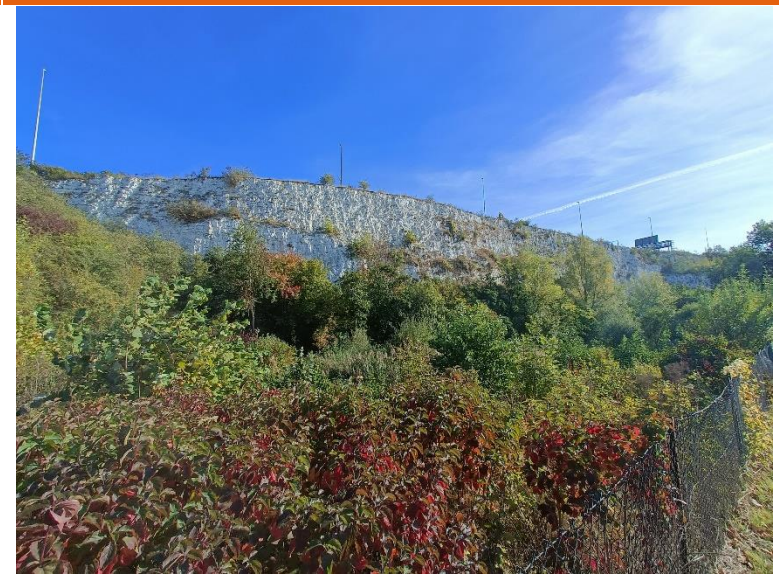


Appendix B

Target Notes

Target Note (TN)	Description	Photograph
TN1	Broadleaved woodland at base of cliffs (western side)	
TN2	Reedbed on-site	

Target Notes

Target Note (TN)	Description	Photograph
TN3	Chalk cliffs on-site (western side)	
TN4	Chalk cliffs on-site (eastern side)	

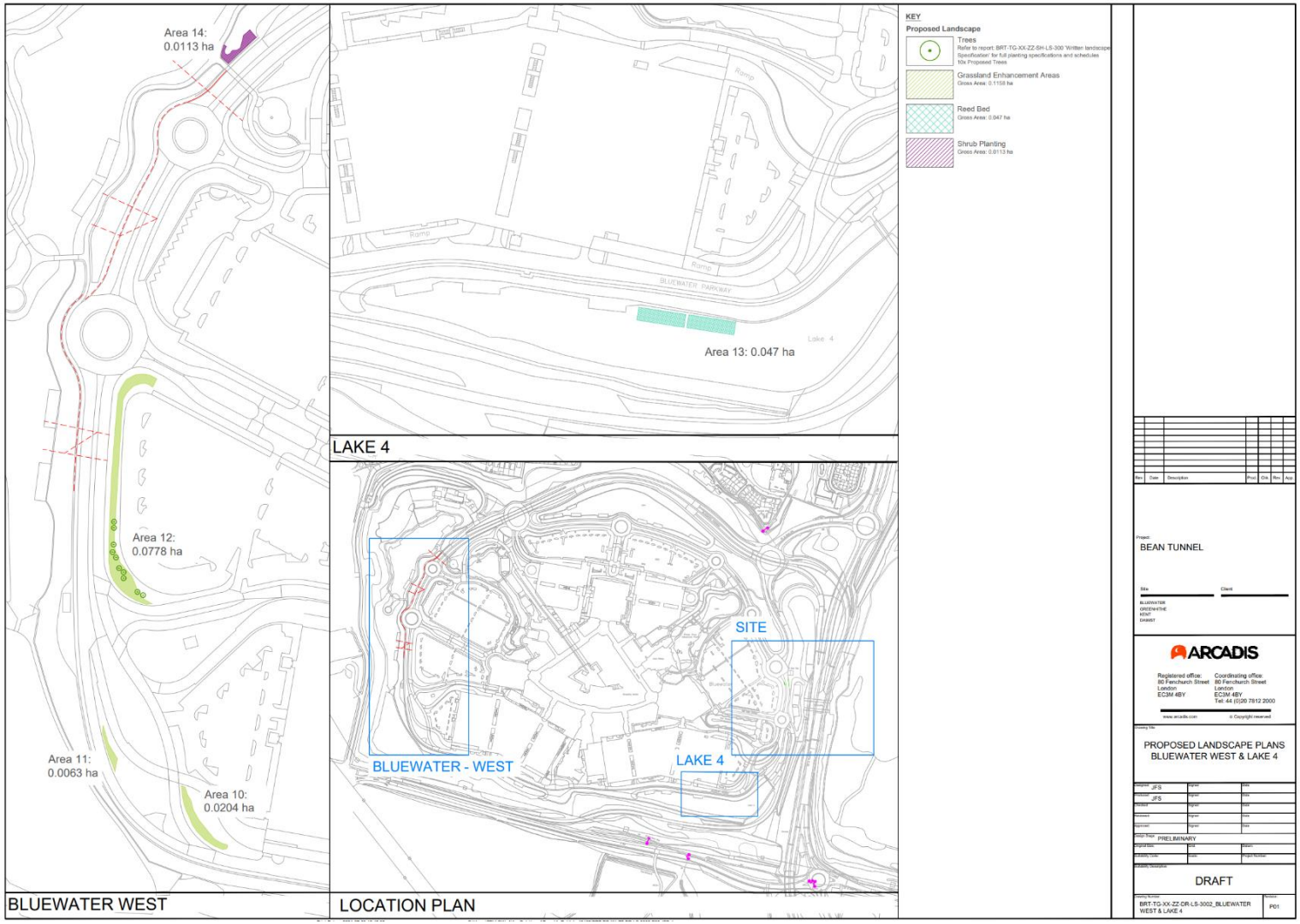
Target Notes

Target Note (TN)	Description	Photograph
TN5	Small-leaved Cotoneaster at base of cliffs on western side.	

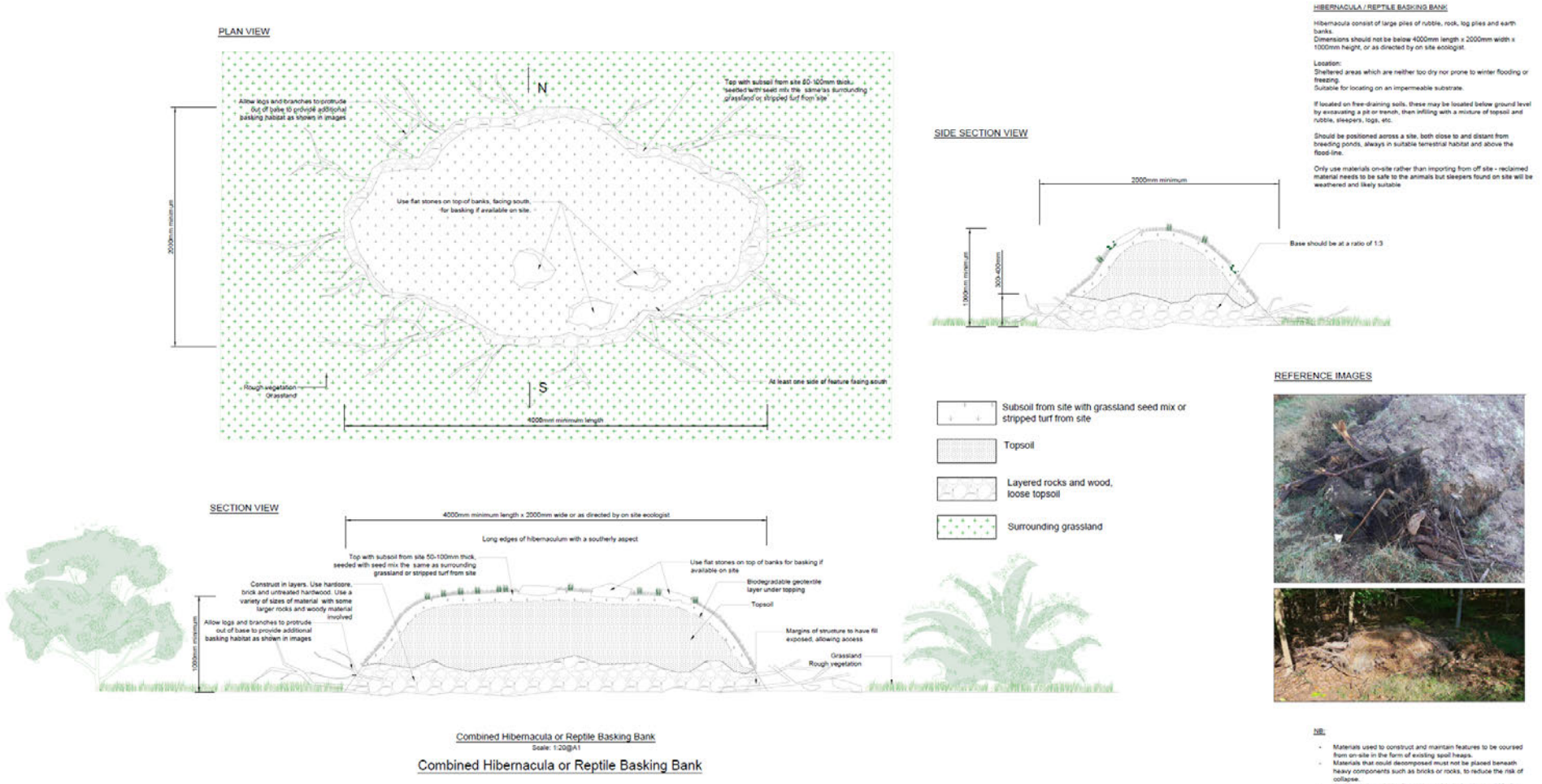
Appendix C

Site Proposals

Drawing 4 – Post construction habitat enhancement/creation within the Bluewater site (off-site) for the purposes of achieving BNG.



Drawing 5 – Hibernacula standard detail


PLAN VIEW
N
S
Allow logs and branches to protrude out of base to provide additional basking habitat as shown in images
Top with subsoil from site 50-100mm thick, seeded with seed mix the same as surrounding grassland or stripped turf from site
Use flat stones on top of banks, facing south, for basking if available on site.
2000mm minimum
Rough vegetation
Grassland
At least one side of feature facing south
4000mm minimum length
SIDE SECTION VIEW
2000mm minimum
1000mm minimum
300-400mm
Base should be at a ratio of 1:3
HIBERNACULA / REPTILE BASKING BANK
Hibernacula consist of large piles of rubble, rock, log piles and earth banks.
Dimensions should not be below 4000mm length x 2000mm width x 1000mm height, or as directed by on site ecologist.
Location:
Sheltered areas which are neither too dry nor prone to winter flooding or freezing.
Suitable for locating on an impermeable substrate.
If located on free-draining soils, these may be located below ground level by excavating a pit or trench, then infilling with a mixture of topsoil and rubble, sleepers, logs, etc.
Should be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line.
Only use materials on-site rather than importing from off site - reclaimed material needs to be safe to the animals but sleepers found on site will be weathered and likely suitable
Subsoil from site with grassland seed mix or stripped turf from site
Topsoil
Layered rocks and wood, loose topsoil
Surrounding grassland
REFERENCE IMAGES
SECTION VIEW
4000mm minimum length x 2000mm wide or as directed by on site ecologist
Long edges of hibernaculum with a southerly aspect
Top with subsoil from site 50-100mm thick, seeded with seed mix the same as surrounding grassland or stripped turf from site
Use flat stones on top of banks for basking if available on site
Biodegradable geotextile layer under topping
Topsoil
Construct in layers. Use hardcore, brick and untreated hardwood. Use a variety of sizes of material with some larger rocks and woody material involved
Allow logs and branches to protrude out of base to provide additional basking habitat as shown in images
1000mm minimum
Margins of structure to have fill exposed, allowing access
Grassland
Rough vegetation
Combined Hibernacula or Reptile Basking Bank
Scale: 1:20@A1
Combined Hibernacula or Reptile Basking Bank
NB:
- Materials used to construct and maintain features to be coursed from on-site in the form of existing spoil heaps.
- Materials that could decomposed must not be placed beneath heavy components such as bricks or rocks, to reduce the risk of collapse.
- Avoid creating rubble piles with multiple holes that could invite rodents.
- Heaps to be a minimum of 1m³ in volume (but preferably much larger) with maximum height of 1m.

Appendix D

Desk Study

Table 12: Desk study bird records within 2 km

Common Name	Scientific Name	Designation	Number of Records	Recent Summer (Apr-Jul)	Recent Winter (Aug-Mar)	Nearest Location	Date of Nearest	Confirmed Breeding?
Great Crested Grebe	*Podiceps cristatus*	Berne:A3	20	13/04/2013	05/10/2016	Bluewater Shopping Centre (TQ5773)	05/10/2016	Y
Cormorant	*Phalacrocorax carbo*	Berne:A3; BoCC5:Green (subsp. Amber); KRDB3	62	05/05/2019	24/11/2019	Bluewater Shopping Centre (TQ5773)	15/09/2019	N
Grey Heron	*Ardea cinerea*	Berne:A3; KRDB3	53	05/05/2019	24/11/2019	Bluewater Shopping Centre (TQ5773)	05/05/2019	Y
Mute Swan	*Cygnus olor*	Berne:A3; Bonn:A2; BirdsDir:A2.2	24	05/05/2019	15/09/2019	Bluewater Shopping Centre (TQ5773)	15/09/2019	Y
Pink-footed Goose	*Anser brachyrhynchus*	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.2	1	23/04/2014		Greenhithe (TQ5875)	23/04/2014	N
Greylag Goose	*Anser anser*	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.1	15	05/05/2019	01/11/2019	Bluewater Shopping Centre (TQ5773)	15/09/2019	Y
Canada Goose	*Branta canadensis*	Berne:A3; Bonn:A2; BirdsDir:A2.1	28	05/05/2019	15/09/2019	Bluewater Shopping Centre (TQ5773)	15/09/2019	Y
Egyptian Goose	*Alopochen aegyptiacus*	Berne:A3; Bonn:A2; ECCITES:C	1		16/11/2018	Bluewater Shopping Centre (TQ5773)	16/11/2018	N

Common Name	Scientific Name	Designation	Number of Records	Recent Summer (Apr-Jul)	Recent Winter (Aug-Mar)	Nearest Location	Date of Nearest	Confirmed Breeding?
Gadwall	*Anas strepera*	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.1; KRDB3	18	28/04/2013	30/01/2019	Blue Circle Quarry (Swanscombe) (TQ5973)	30/01/2019	N
Shoveler	*Anas clypeata*	Berne:A3; BoCC5:Amber; Bonn:A2; ECCITES:C; BirdsDir:A2.1	9	09/04/2019	30/01/2019	Blue Circle Quarry (Swanscombe) (TQ5973)	30/01/2019	N
Pochard	*Aythya ferina*	Berne:A3; BoCC5:Red; Bonn:A2; BirdsDir:A2.1; KRDB3	2		30/01/2019	Blue Circle Quarry (Swanscombe) (TQ5973)	30/01/2019	N
Red Kite	*Milvus milvus*	Berne:A3; BoCC5:Green; Bonn:A2; ECCITES:A; BirdsDir:A1; WCA1	6	05/04/2010	23/03/2019	Bluewater Shopping Centre (TQ5773)	23/03/2019	N
Marsh Harrier	*Circus aeruginosus*	Berne:A3; BoCC5:Amber; Bonn:A2; ECCITES:A; BirdsDir:A1; KRDB3; WCA1	3		28/01/2019	Greenhithe (TQ5875)	28/01/2019	N
Water Rail	*Rallus aquaticus*	Berne:A3; BirdsDir:A2.2; KRDB3	8		26/12/2014	Bluewater Shopping Centre (TQ5773)	26/12/2014	N
Avocet	*Recurvirostra avosetta*	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1; KRDB3; WCA1	6	28/04/2013	15/03/2015	Greenhithe (TQ5875)	15/03/2015	N

Common Name	Scientific Name	Designation	Number of Records	Recent Summer (Apr-Jul)	Recent Winter (Aug-Mar)	Nearest Location	Date of Nearest	Confirmed Breeding?
Grey Plover	*Pluvialis squatarola*	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.2; KRDB3	13	29/04/2012	24/11/2019	Greenhithe (TQ5875)	24/11/2019	N
Dunlin	*Calidris alpina*	Berne:A2; BoCC5:Red; Bonn:A2; BirdsDir:A1; KRDB2	50	16/07/1994	24/11/2019	Greenhithe (TQ5875)	24/11/2019	N
Mediterranean Gull	*Larus melanocephalus*	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1; KRDB3; WCA1	10	20/04/2015	29/09/2011	Bean (near Dartford) (TQ590723)	20/04/2015	N
Black-headed Gull	*Larus ridibundus*	Berne:A3; BoCC5:Amber; BirdsDir:A2.2	49	24/04/2019	01/11/2019	Bluewater Shopping Centre (TQ5773)	15/09/2019	N
Common Gull	*Larus canus*	Berne:A3; BoCC5:Amber; BirdsDir:A2.2; KRDB1	18	06/07/2018	02/12/2018	Bluewater Shopping Centre (TQ5773)	02/12/2018	N
Lesser Black-backed Gull	*Larus fuscus*	BoCC5:Amber; BirdsDir:A2.2	25	13/05/2017	11/09/2019	Bluewater Shopping Centre (TQ5773)	28/01/2017	N
Herring Gull	*Larus argentatus*	BAP; BoCC5:Red; BirdsDir:A2.2; S41; KRDB2	30	24/04/2019	01/11/2019	Bluewater Shopping Centre (TQ5773)	02/12/2018	N
Rock Pipit	*Anthus petrosus*	Berne:A2; BoCC5:Green (subsp. Amber); KRDB1	20	22/05/1994	01/01/2014	Greenhithe/Swanscombe (TQ5974)	01/01/2014	N
Fieldfare	*Turdus pilaris*	Berne:A3; BoCC5:Red; BirdsDir:A2.2; WCA1	3		02/03/2015	TQ6073 (TQ6073)	02/03/2015	N

Desk Study

Common Name	Scientific Name	Designation	Number of Records	Recent Summer (Apr-Jul)	Recent Winter (Aug-Mar)	Nearest Location	Date of Nearest	Confirmed Breeding?
Jackdaw	*Corvus monedula*	BirdsDir:A2.2	9	28/04/2016	28/03/2019	Bluewater Shopping Centre (TQ5773)	22/11/2018	Y
Rook	*Corvus frugilegus*	BirdsDir:A2.2; BoCC5:Amber	3	18/06/2016	15/01/1994	Bluewater Shopping Centre (TQ5773)	18/06/2016	N
Raven	*Corvus corax*	Berne:A3	4	09/04/2019	28/01/2017	Bluewater Shopping Centre (TQ5773)	28/01/2017	N
Lesser Redpoll	*Carduelis cabaret*	BAP; Berne:A3; BoCC5:Red; KRDB1; S41	4	28/04/2012	01/01/2019	Bluewater Shopping Centre (TQ5773)	01/01/2019	N
Common Crossbill	*Loxia curvirostra*	Berne:A2; WCA1	1	31/07/2015		Bluewater Shopping Centre (TQ5773)	31/07/2015	N
Black Swan	*Cygnus atratus*		1		16/01/2015	Beacon Wood CP (TQ5871)	16/01/2015	N

Table 13: Protected and Notable Plants within 2km of the site.

Common name	Species name
Field Eryngo	*Eryngium campestre*
Bluebell	*Hyacinthoides non-scripta*
Butcher's-broom	*Ruscus aculeatus*
Pyramidal Orchid	*Anacamptis pyramidalis*
Common Spotted-orchid	*Dactylorhiza fuchsii*
Broad-leaved Helleborine	*Epipactis helleborine*
Green-flowered Helleborine	*Epipactis phyllanthes*
Bird's-nest Orchid	*Neottia nidus-avis*
Bee Orchid	*Ophyrys apifera*
Man Orchid	*Orchis anthropophora*
Early-purple Orchid	*Orchis mascula*
Jersey Cudweed	*Gnaphalium luteoalbum*
Cyclamen	*Cyclamen*
Sanicle	*Sanicula europaea*
Carline Thistle	*Carlina vulgaris*
Chicory	*Cichorium intybus*
Small Cudweed	*Filago minima*
Common Cudweed	*Filago vulgaris*
Kent's Hawkweed	*Hieracium kentii*
Autumn Hawkweed	*Hieracium sabaudum*
Golden-samphire	*Inula crithmoides*
Field Pepperwort	*Lepidum campestre*
Dittander	*Lepidum latifolium*
Four-leaved Allseed	*Polycarpon tetraphyllum*
Ragged-Robin	*Silene flos-cuculi*
Corn Spurrey	*Spergula arvensis*

Common Sea-lavender	*Limonium vulgare*
Field Scabious	*Knautia arvensis*
Heather	*Calluna vulgaris*
Wintergreen	*Pyrola rotundifolia*
Dyer's Greenweed	*Genista tinctoria*
Yellow Vetchling	*Lathyrus aphaca*
Hairy Vetchling	*Lathyrus hirsutus*
Sickle Medick	*Medicago sativa subsp. falcata*
Sainfoin	*Onobrychis viciifolia*
Crosswort	*Cruciata laevipes*
Wild Clary	*Salvia verbenaca*
Common Eyebright	*Euphrasia nemorosa*
Hoary Plantain	*Plantago media*
Heath Speedwell	*Veronica officinalis*
White Mullein	*Verbascum lychnitis*
Common Rock-rose	*Helianthemum nummularium*
Quaking-grass	*Briza media*
Rye Brome	*Bromus secalinus*
Early Meadow-grass	*Poa infirma*
Annual Beard-grass	*Polypogon monspeliensis*
Borrer's Saltmarsh-grass	*Puccinellia fasculata*
Sea-buckthorn	*Hippophae rhamnoides*
Wild Strawberry	*Fragaria vesca*
Tormentil	*Potentilla erecta*
Sowbread	*Cyclamen hederifolium*

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